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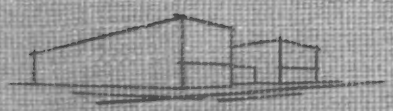

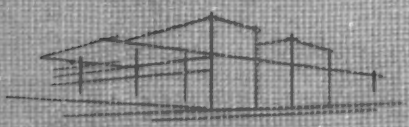

THE NATIONAL ELEMENTARY PRINCIPAL, VOLUME XXXIX, NUMBER 1, SEPTEMBER 1959

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Elementary School Buildings . . .

Design for Learning

DEPARTMENT OF ELEMENTARY SCHOOL PRINCIPALS
National Education Association

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Foreword...

Elementary schools should be built for children. The design, size, and arrangement of buildings and sites, the areas and uses made of playgrounds and other school facilities are changing with each generation.

When students were expected to sit at their desks for long periods of time, to study and recite, school architecture was formal and unimaginative. Examples of these buildings may be found in the aging sections of many older communities today. They are often castles with towers, topped with belfries, and usually multi-story in height. Due to their austerity and coldness, the smiling, skipping child slows his pace and takes on an unusually solemn look as he passes through the portals into dingy halls and bleak classrooms.

Today, most parents, teachers, and child psychologists recognize that children of different levels of maturity have different interests and varied attention spans. For children to acquire the greatest amount of learning, the school day should be divided among periods of study, discussion, group work, testing, and play. These activities require movable desks, larger and often self-contained classrooms, and a multi-use room for a cafeteria, for playing games during inclement weather, and for school assemblies. Modern architecture provides the school building with a home-like appearance of warmth and cheerfulness through the utilization of sunny courts, glass panels, planters of flowers, and landscaped lawns.

Too often, architects have been charged with the responsibility of planning and designing a new school building without assistance from the professional staff and the community. When this is the procedure, costly mistakes are often made. Additional facilities are sometimes found necessary—more shelves for books, bulletin boards for display of children's work, storage space for equipment and supplies. Chalkboards may be too high or too low and the budding six-year old artist may find no classroom sink for cleaning his brushes.

The most useful, convenient, time saving, and comfortable schools today are planned by many groups and individuals in the community. Certainly, the principal and teachers who will use a building should participate in its planning from the beginning. When this practice is followed, costly mistakes are kept to a minimum and the facilities reach higher functional standards. The results make it possible to provide better education for boys and girls.

The National School Boards Association commends the Department of Elementary School Principals, NEA, for preparing its 1959 yearbook on the subject of elementary school buildings. We believe that many of the ideas presented in this publication can be highly beneficial to thousands of communities throughout the nation if they are followed. This project is another indication that the teaching profession and the lay public can and should cooperate to design the most functional, durable, flexible, safe, and beautiful school buildings for children at a reasonable cost.

ROBERT E. WILLIS, *President*
National School Boards Association

BUILDING FOR CHILDREN

Children are the heart of a school. Books and desks, playgrounds and classrooms have their reason for being in the children they serve. Without children, a school plant is nothing more than concrete and steel; with children, it becomes a dynamic setting for learning and teaching. School buildings must be conceived in such a framework if they are to implement—rather than impede—the functioning of a good school program.

Translating Children's Needs Into Terms of Design

H. H. Waechter

EDUCATION and architecture have in common a characteristic which is most important but which is not always fully recognized in this age of specialization. Both exist as services for people.

Architecture, when it is concerned with school plant facilities, brings architect and educator together in a sincere effort to understand and meet the nature and needs of children. The main reason for this shared concern is that we are determined to make our buildings subservient to these basic considerations. It is easier, however, to see the importance of this guiding principle than it is to put it into operation. We are often puzzled by the problem of just how to do this.

Sources of Help

There are two media at our disposal as we approach our problem. One is research; the other is design. Research makes us aware of the scientific problems involved. It also makes available a wealth of information to help us identify and interpret the needs of children. Design welds together imaginatively into a creative whole the stunning amount of information which study and research provide.

In this discussion, we shall emphasize primarily the theoretical side of the question. Elusive as the artistic masterminding may be, it is a strange fact that translating scientific information into terms of school plant has evaded pinpointing to a disturbing degree. Only in engineering research do we have up-to-date information which is directly applicable to construction. Such information is, however, applicable to most types of construction and will not be discussed here.

New Spaces for Education

To carry out educational aims we need an environment which supports our endeavors to further the development of the whole personalities of children. The architectural contribution to this effort is to create spaces which will contribute to the performance of many tasks. Ordinarily, we think in terms of providing a certain number of square feet at a certain cost. And the cost is thought of as something that has to be palatable to the taxpayer. Responsible school board members think of school construction in terms of providing facilities for good teaching, but it is not often that we consider a new building program as a welcome oppor-

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tunity to re-examine and overhaul the educational system.

Economy in building is related to the efficiency of the building as a supporter and stimulator of teaching and learning. Unfortunately, there is little understanding that such economy in a building program can result only if basic considerations prevail. The architect is not likely to create the kinds of space which will make it possible for educational tasks to be performed effectively unless he has a pretty clear understanding of the nature of those tasks.

One task is to help the classroom teacher constantly to group and regroup the class for various activities. The nature of these activities and the conditions under which they take place need to be studied in every detail in order to find better solutions. Many people continue to think only in terms of the conventional self-contained classroom. No doubt, many functions within the school and many local conditions will require the use of the conventional classroom for years to come.

There are, however, new thoughts and new experiments which point toward gross deviations from the existing pattern. For example, we may have larger groups in larger rooms with more than one teacher. There may be need for still larger spaces where mass communication media can deal with subjects that lend themselves to mass media treatment. We may need to have many more small isolated rooms and off-the-beaten-track areas, especially shaped and conditioned (by color, equipment, acoustics, and lighting) for individual pursuits, tutoring, advising, and testing.

In other words, the diversification of space will become a tool of education. Teaching processes should not be forced to adjust to makeshift arrangements in a school building. The needs of instruction have to be anticipated, at least in a broad way, if they are to take the important place they should take in the architect's creative design process.

In providing for multiple use of space, standardized structural components and modular planning have proved helpful. These devices, however, should not be allowed to become mere gimmicks. An architect would be shunning his responsibilities if he just provided sheltered space and then told the teacher, "Here are a bunch of partitions; suit yourself!" Flexibility is important, but not for its own sake. The possibilities within a flexible system should make sense in terms of integrating educational and architectural philosophy.

Nature of Design

To get nearer to the problem of knowing more about children and building for their needs we have to look beyond the tangible aspects of an ephemeral technology. We put the cart before the horse if we worry first about structural plans and details and then later get concerned about the way spaces will ultimately function. In recent years, too much emphasis has been given to technology in a rather insipid way without making it always subservient to educational needs. This statement applies particularly to gadgetry which eliminates simple experiences of educational value. We should stress continuously the human element in design. The prevailing dreariness and institutional character of school buildings, often sailing under false flags of modernism, should be regarded as undesirable.

Design is a creative process and a creative process is a phenomenon which many people do not understand. They overlook the use of creativeness as a working process. They think design is wholly a matter of technology and organization. Yet most of us can readily distinguish a beautiful school where the children can be happy and learn well from another

school that is ugly and uninspiring. In other words, values which are recognized once they take form and exist are not considered factors to reckon with when concepts of design are being worked out before the building is constructed. It happens, then, that those qualities which make a building most suitable for teaching are left to chance.

In addition to the use of creative abilities, we need better understanding and use of scientific findings.

Often, in planning a school building, the practice is to make the building subservient to specific requirements and to building codes as interpreted by school board members, superintendents, architects, and various public officials. These varied ideas and requirements are shaped into buildings which are often of a kind and quality which was not anticipated. The building may satisfy a multitude of individual requirements, but the accumulated piling up of answers results in something new and unexpected. The building, which was originally assigned the passive role of satisfying multiple requirements coming from all directions, suddenly becomes a whole—an active element, exerting its own influence and character. And often it has become a monster.

Architecture as a Teaching Tool

The child is a rather helpless "client" in this general struggle over a building venture, with no means to protect his interests. He is still very much a part of his family and dependent on it, particularly on his mother. The school can provide for only part of his needs. Yet the school, for all of its traditional concentration on academic goals, has taken on many new functions. The family has less control over its members and exerts less influence upon the development of our society. As schools seek to cope with the problem of taking on more responsibility, they become increasingly complex in purposes, methods, and organization. While one would assume that the modern school should strive to provide the kinds of space and shelter which are intimate and childlike, most modern schools have grown into sizeable complexes.

Architecture is more simple, at least in principle, than first appears. Most readers of this discussion knew architecture before they could read. A saying attributed to Osbert Lancaster, that "architecture is an inescapable art," [1] has acquired deeper meaning since the advent of modern psychology and physiology. Except for those who were born in primitive tribes under a tree, in an unadorned cave, or in some other natural shelter, most of us have lived all of our lives in "designed" shelters. We see these edifices from different angles and with different perception. The architect studies the effect of space, structure, texture, and light on the human spirit and body, although his scientific equipment is not very well refined. Man's well-being, the functioning of his nervous system, and his efficiency to act are vitally influenced by the architect's artistic ability and his capacity for making sense out of the game of putting sticks and stones together. It is not hard to see, then, why the architecture of the child's school and home must be considered among the most important conditioners in his development. Architectural space can be a tool of teaching and of mental hygiene.

There are many situations where the physical environment is a decisive factor in a child's behavior. Most of all, a child should perceive of space in ways that make him feel happy, at ease, or, at times, stimulated. These feelings are basic influences upon the child's ability to do his best learning and upon the teacher's ability to do his best teaching. We need to know not only *how* Johnny spends his time but also *where* he prefers to spend

Environment makes a difference

his time, *when*, and *why*. A lot of Johnny's reactions are obvious in outer form but nobody can explain them without learning about the specific conditions of space which are playing upon Johnny's nerves.

The classroom teacher is conditioned by space, too. Not only is his own well-being affected, but also he has to make decisions all day long—and sometimes rather suddenly—in planning and carrying out school activities. These decisions are strongly colored by environmental conditions.

Lighting for Various Tasks

Sometimes, isolated findings in different fields of knowledge may lead us to contrary answers to our problem. As an example, the psychological requirements for lighting (such an important factor in any artistic approach to problems of form and space) are not always identical with and are sometimes in conflict with the physiological lighting requirements for specific tasks. A high level of shadowless illumination is usually considered desirable for drafting and other seeing tasks which require high acuity. At the same time, the required high level of illumination, in conjunction with the quality of space it illuminates, may create a psychological discomfort. Much nervous irritation may well result from this overdose of light upon the seeing nerves.

Children do not naturally stay at one task in one place for long periods of time. They shift location, not only to adapt to various activities but also to seek relief from balanced brightness and to find stimulating areas of brightness contrasts or of low level illumination. Then, while one activity may require very evenly distributed light with little awareness of space limitations and no distraction by a beautiful view, another activity may need the opposite of any or all of these conditions.

Visual Experience of Space

How can we control all the spatial characteristics which are so important—and at what cost? Who has to strive for a balance between the requirements for each learning need, the psychological factors in situations, the technical means for serving the needs, and the budget to carry out the project?

Those of us who are aware of such problems, which come up constantly in creative work, often wish that our practical experience and our imagination could be further supported by scientific investigation. The literature of visual arts is saturated with suggestions of better ways of knowing and using space and structure by visual means. One of the most concentrated statements in this field was made by Kepes, who acknowledged his indebtedness to Gestalt psychology. He pointed out that "the experience of an image is thus a creative act of integration. Its essential characteristic is that by plastic power an experience is formed into an organic whole: Plastic arts, the optimum forms of the language of vision, are, therefore, an invaluable educational medium." [2]

Visual experience is a decisive factor in shaping and using environmental space, whether we are considering human conditioning in general or the specific use of space as an educational tool. This experience will differ under various conditions. To quote Kepes again: "The mastery of nature is intimately connected with the mastery of space; this is visual orientation. Each new visual environment demands a reorientation, a new way of measuring. Seeing spatial relationships on a flat land is a different experience from seeing them in a mountainous region." In other words, the artistic concept of the designer has to embrace not only size and quality of space but also indigenous conditions under which the

work is shaped. There are difficulties, however, when the designer seeks, on the basis of his own space experience, to project himself into the space experience of children at various age levels.

We misunderstand the problems, however, if we conceive of "space" as only two-dimensional (for instance, "floor space" or "blackboard space") or as three-dimensional (for instance, classrooms, hallway, or heated air volume). Moholy-Nagy was one of the first to popularize the idea that we are dealing with vision in motion. He stated that "vision in motion is simultaneous grasp. Simultaneous grasp is creative performance—seeing, feeling and thinking in relationship and not as a series of isolated phenomena. It instantaneously integrates and transmutes single elements into a coherent whole. This is valid for physical vision as well as for the abstract." [3]

There is a direct connection between the imagination of school board members conceiving a building task, educators formulating the educational specifications for promoting visual concepts, the architect consolidating this vision into an organic space concept, the classroom teacher making creative use of the space, and the child being influenced by these conditions.

A few persons have suggested that parts of school buildings may be such that they could be built or altered by the child as part of his school experience. In this way, the child could participate in creating his own environment. Older children could actually do construction work in cases where the school building consists of demountable, movable, or disposable components attached to certain types of framing. Also, movable furniture units are part of the ever-changing stage setting for education. This type of activity for children is technically feasible and could provide valuable experiences. However, its effect on various teaching areas would have to be analyzed by experiment.

In any event, the whole person (either child or teacher) is greatly influenced by his spatial environment. We cannot stress enough the therapeutic and educational value of the visual environment. Better recognition and understanding of this problem will let us come nearer to well-balanced solution of school construction problems, so lacking now.

The Understanding of Space

There is another area of scientific investigation with great bearing on a child's spatial needs. A large literature exists on studies of space perception and conception. Although in this area we must wait for more translations of scientific findings into specifics which can be applied in and absorbed by design, we now have a few facts for use in designing. Getting acquainted with these studies is fascinating because they cut across the fields of philosophy, psychology, physiology, physics, and mathematics.

Piaget and Inhelder draw a fundamental distinction between spatial perception and the earliest spatial imagery. As a general conclusion they say that "because spatial perception takes place in the presence of the object whereas the image arises only in its absence, perceptual space develops far more rapidly than conceptual space, the former even reaching a projective and quasi-metric level while the latter has barely begun. There is, therefore, an interval of several years between perceptual and conceptual construction, despite their pursuing a similar path of development. And moreover, should the existence of these two distinct levels be overlooked, the illusion arises that the idea of space begins to be worked out on the basis of simple Euclidean shapes." [4]

One important detail to remember is a child's inability to discriminate between different viewpoints for some years. Most children will be from eight to ten years of

age before they perceive perspective. Perhaps the thought is not farfetched that a first-grade classroom could not possibly look the same as a fifth-grade classroom which, nevertheless, is a common occurrence. One may well view with skepticism the often heard demand for "flexibility" as an easy way out while we have to think of the differences in space quality at various age levels.

Since a child moves for many years primarily in a set environment of home and classrooms within the school, he has a prolonged exposure to regular and repeated conditions. Yet these rooms are supposed to be changeable and used for changing teaching situations. Actually, therefore, a static space of definite quality is modified by motion and time. These factors produce phenomenological experiences of a rather complex nature. In addition, the responses, Gestalt-wise, may differ greatly in the same age group.

Allport remarks that "such aspects as sensory qualities, dimensions, segregation, surface, contour, and figure when taken alone do not supply the full perceptual meaning. As distinguished from such aspects, motor considerations also must claim our attention." [5] Allport's broad views and penetrating discussion exemplify the vast amount of theoretical information which cries for evaluation and scrutiny for possible contributions to design. The thought that millions of dollars worth of school buildings are under construction each year without the benefit of design backed up by current knowledge in psychology and other sciences is depressing.

Physiological Reactions to Space

When we turn to another field of investigation, the influence of design on behavior, we find that nervous reactions and mental health cannot be overestimated.

Physiological psychology, dating back to Wilhelm Wundt, has led to many investigations which are applicable to design. Few architects have done so much pioneering in modern schoolhouse design and have so persistently called our attention to the importance of designed environment for our physiological well-being as has Richard Neutra. He stated that "organizally oriented design could, we hope, combat the chance character of the surrounding scene. Physiology must direct and check the technical advance in constructed environment. This setting of ours is all powerful; it comprises everything man-made to supply man, from the airy storage compartment of our toothbrush to the illumination of a speedway interchange, or of the neighborhood day-care center for toddlers." [6]

In this area of physiology, we find perhaps the largest amount of investigation available, despite the fact that this should be considered only a beginning. In this connection, the work of D. B. Harmon on seeing conditions and similar research at the Yale Clinic on Child Development, among others, comes to mind.

A study which has delighted us in the field of residential design is Kennedy's book, *The House and the Art of its Design.* [7] There is no parallel publication in school building design where child behavior is related to building conditions.

Mental health problems usually are dealt with in terms of conditions within man or between people. Environment rarely enters the picture except, perhaps, for extreme conditions such as living in slums and prisons or severe exposure to natural environment. Yet we know that feelings of comfort or irritation in our movements throughout the day can be traced back to the various impressions that we (including our children) receive from man-made environment of the more "ordinary" kind.

Perusal of textbooks on mental hygiene in schools does not reveal any insight into

problems of physical environment as an influence on children. Guidance, counseling, and correction seem to take place in empty space. One might have the suspicion that maladaptations to physical environment originating from faulty design or nervous disorders developed under the influence of poor physical environment are conjured away by adjustment to existing conditions. In other words, we learn to tolerate the annoying factors.

We have a rich literature in psychology which deals with the environment. However, it is concerned with social, language, and other types of environment, neglecting sense reactions to the physical environment.

A recent joint publication by architects and educators has called attention to the child's needs in relation to space.[8] We are told that children are affected emotionally by architecture and that they learn through space. "No one ever learned to swim without water, and you do not develop a feeling for beauty if you never see anything but ugliness" is a good motto for heeding the needs of children.

Human Ecology and Anthropology

Some areas of biology, particularly human ecology, deserve careful study to understand how problems of adaptation could have a bearing on designing for children.

The reader may be interested in the studies of Sears,[9] Geiger,[10] and Hawley.[11] Human ecology sheds much light on the quality of our creativeness on which the *quality* of our man-made environment greatly depends. Then, again, the kind of life our children will live depends on the *quality* of the environment which we help to create. As Hawley puts it, "Living matter is irritable, responsive to external circumstances, and the forms of life have been changing constantly." The needs of the child, therefore, are a variable directly related to different kinds of environment.

Also, one may mention that anthropology could give further insight into the nature of the child as an aid in designing for his needs. Differences in culture and in ranges of human behavior should influence school building design.

The Future of School Design

In the face of overwhelming studies in various scientific fields, how is it possible that we have no satisfactory suggestions for translating our knowledge of children into terms of school plant? Experts feel almost as foolish as the man who complains about the weather but does not do anything about it.

But there is hope for the future. The scientific disciplines, from which we will learn and get cooperation, are almost as young as is modern, problem-solving architecture. These areas have already grown together, particularly in technological research, and they will connect with each other in new areas as time goes on. Increases in population and a shortage of teachers already have led to new changes and will stop the present stringing up of classrooms. School boards should be encouraged to depart from the status quo, allow for scientific experimentation, and avoid producing obsolescence.

Finally, let us not forget the emotional values which artistic design may bring to children. No unartistic design can be functional and take successfully into account the needs of children. When the artist's hand turns prosaic facts into poetry, the good life becomes possible in school. Children are usually artists in their own right and often know what they like about a school building. Only with this in mind do we gain confidence that scientific knowledge will enable us to bring more refinement to our work and more surety that we serve our children's needs.

School Buildings and the Learning Program

W. George Hayward

THE school building and all that is in it may either enhance the learning environment or detract from it. Its purpose is to provide physical conditions which will make possible a good school program based on a sound philosophy of learning.

School building design must stem from a knowledge of how children learn and develop and interact with their environment, and from the requirements of a program based on such knowledge. A good school plant provides facilities for the whole range of teaching techniques essential to a modern instructional program—for work in large groups, small groups, and individually; for remedial instruction; for medical and psychological services; and for the host of other activities necessary to offer each child maximum learning opportunities.

The focus should always be the child. His education is the reason for it all.

W. George Hayward is Assistant Superintendent of Schools and Principal of Eastern School, East Orange, New Jersey.

The Present Situation

Approximately half of the past quarter century was consumed by a depression and a war which crippled new school planning and building. The period since 1946 has been one of frantic planning and building to meet the immediate needs brought about by an unprecedented number of births.

During this past decade, in spite of the pressures of time, limited finances, and demands for a "traditional" approach, much has been accomplished. Educators, architects, engineers, boards of education, equipment designers and fabricators, and the lay public deserve much credit for the ways in which new knowledge of design, new materials, and new uses for old materials have been incorporated into school buildings.

At this point, it seems appropriate to pause and take stock—to check against sound principles of building planning, to

clarify needs based on best educational programs, to decide what represents true economy, and to determine on what basis compromises are reasonable. It is time to re-evaluate what has been done and what is planned for the future. Too often, school design is molded by decisions which may look sound on the surface but which, if studied against the fundamentals of good elementary school building planning, would be made differently. This article will point out some of the major principles of good school design and good school programs against which building plans should be evaluated.

Future-Proofing

Many school buildings in use today were built 50 to 75 years ago. It is not unreasonable to expect that modern buildings, utilizing more durable materials, will be in use for many decades to come. To develop buildings which will serve children adequately for this span of time is a tremendous challenge and one which must be realistically faced. We cannot possibly foresee all the demands which future years will make upon the buildings we construct today. But we can see that adaptability is built into the school plant. The planning of school buildings for tomorrow must be done today. The test of a properly future-proofed elementary school starts the day it is opened and continues throughout its long life expectancy.

According to one architectural authority, "Style in architecture emerges when there is a lack of creativity on the part of architects." It has also been said that "architecture responds in large measure to the tastes and vision of the client." Educators and the public, as clients, must be alert to see that they do not have false concepts of style which will hinder the designing of properly future-proofed elementary schools. We must continually review the limiting effects which certain types of schools have on the educational program, make allowances for future developments, and interpret all of this to architects. Only then can architects and builders utilize their knowledge of design and materials in such a way that "style" does not limit adaptability and flexibility.

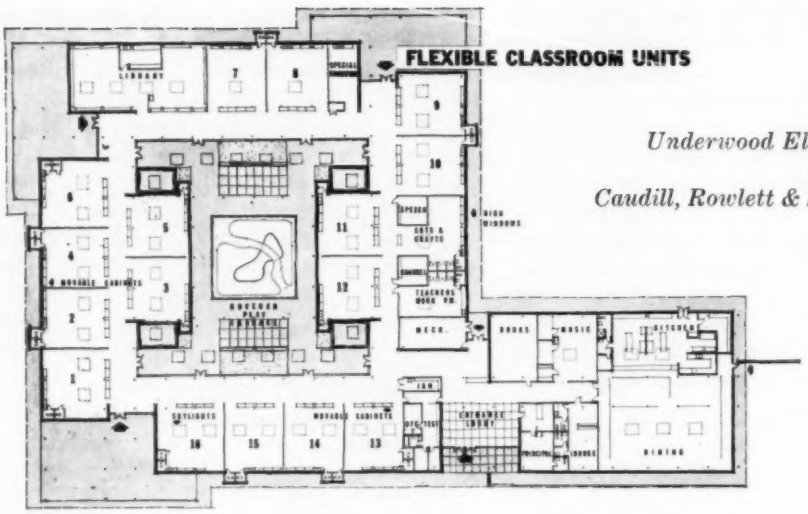
Equally important is the responsibility of educators to keep the public informed of the reasons for changes in school building design. "What was good enough for me when I was in school" cannot possibly produce a school adequate for the needs of future generations.

Classrooms

It would seem almost unnecessary to point out that the classroom is the most important single element in the elementary school. The classroom is the place where most of the learning takes place. It should be thought of as one of the major tools teachers use to provide diversified learning opportunities for boys and girls. To design classrooms which will adequately serve this function requires careful study and evaluation. These are some of the things that should be considered.

Flexibility: The teacher and children should be able to arrange the classroom in many different ways to accommodate the varied activities which are part of each day's work. An individual child reading quietly behind a low screen or bookcase without being disturbed, a group sharing their free reading, two children drilling each other on arithmetic in a peripheral cluster center, a committee working on a special science project, a reading group with the teacher, the remainder of the class carrying out assigned work at their desks—all this is not uncommon of the picture one sees looking into a classroom today.

Can the classroom meet each of these situations with a maximum of ease and a minimum of control on the part of the



Underwood Elementary School
Andrews, Texas
Caudill, Rowlett & Scott, Architects

teacher? Can his peripheral vision see everything going on in the room and yet, at the same time, can children feel apart from the group when they need to? Can they have a feeling of personal contact when working with two or three other pupils on a project? The classroom must make possible a variety of warm child to child and child to teacher relationships. It must be flexible enough to provide many patterns of organization during a given school day. Flexibility within the classroom is an essential ingredient for potential adaptations to programs and practices of both the present and the future.

Structural flexibility within the building should be provided whenever possible. Internal reorganization of areas in a building, and changes in room sizes and assigned space allocations are only possible when the number of load-bearing walls are kept at a minimum.

Space: The space required for an elementary school classroom can no longer be computed on the basis of the floor area needed for a desk and chair, multiplied by the average number of children in the room. It is difficult to state minimum, desirable, and maximum standards that will be equally valid for all situations. All too often, the minimum becomes the standard. However, for the elementary school classroom, 40 to 50 square feet per pupil should not be considered unreasonable. For a class numbering 25 students, this would provide a room of approximately 1000 to 1250 square feet.

Opinions vary on the cost of a school with classrooms of about 800 square feet as compared with 900 or 1000 square feet. But the difference in cost must be carefully analyzed. Although it is difficult to determine accurately this difference in the cost of the classroom as a unit, some architects and builders claim that it will add a relatively small percentage of additional cost to a total building.

To give children room to learn is neither wasteful nor extravagant. To force them into patterns of conflict, regimentation, and limitation because of classrooms which are too small is worse than wasteful.

Shape: Traditionally, classrooms are square or rectangular. But is this necessarily the best shape, the one that will

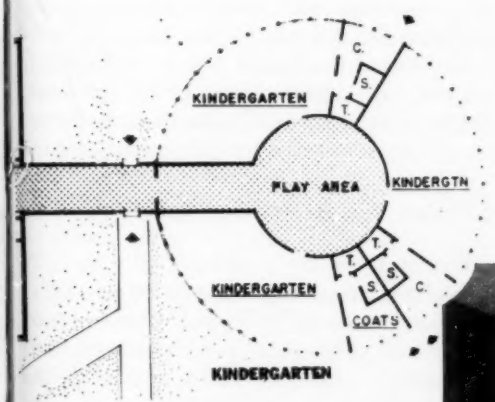
contribute most to setting a desirable learning environment?

In recent years, architects and educators have combined their creativity and knowledge to design classrooms of different shapes. This has not been done, as some would have us believe, "just to be different," but rather as an attempt to achieve a classroom based on defined principles. Fifty or seventy-five years ago there were fewer materials available for construction and classroom shape was limited accordingly. But today, new methods and new materials make it possible to shape a classroom in different ways so that it will be more functional, flexible, and attractive. There will be even greater possibilities in the future.

At least twelve different shapes for elementary school classrooms have been tried in different parts of the country. These new designs offer tremendous possibilities. For instance, a wide-angled corner compared with a 90-degree corner is far more usable for a small circle of children. Many activities, particularly in a primary classroom, are carried on in arcs or circles. Full circle classrooms would create problems yet unsolved.

Providing for adequate and desirable natural lighting adds to the problems of achieving desirable shape. As we resolve the problem of combining the different desirable elements which make up a good classroom learning area, new classroom shapes will emerge.

The child and the room: In designing classrooms, it is important to keep in mind the way children will work in it—and how it will appear to children. How will decorative detail look from the four-foot



Huth Road Elementary School
Grand Island, New York
Pfohl, Stoll & Roberts, Architects

level? Are display boards mounted so that children can put up their own pictures and announcements? Are colors planned so that the colors children bring with them into the room will blend and be attractive? Is the room "too busy" with the inclusion of varied materials and textures? Do special features which look attractive deprive the room of needed space? These and many other questions must be asked before the building is erected.

Other considerations: Careful study and experimentation must be done in connection with such elements as lighting—both natural and artificial—air pressure, humidity, temperature control. These things have significant daily impact on the people who use the building and, through them, on the learning program.

For example, some schools have been designed with great expanses of clear glass in each classroom. The object has been to improve natural lighting and make children feel a close relationship with the out-of-doors. But in some instances, the glare has been so great that blinds must be pulled most of the day. Again, blackboard or bulletin board surfaces which looked highly desirable in sample form have been found not to stand up well under the test of long-term use. A continuing flow of experimentation and evaluation is essential if the next classroom built is to be better than previous classrooms.

Space for Special Services

In the decades ahead, increased attention will be given to the early identification of children's special needs. This requires specialized facilities.

A partial list of some of the specialized services which should be a part of a good elementary school program might well include speech correction, psychological testing and treatment, health services, remedial work, and special classes for low mental ability groups, physically handicapped and emotionally disturbed children. Without adequate facilities, many of these services are neglected; or, if provided, they are so handicapped by physical limitations that children do not receive the kind of help they need. In too many instances, the initiation of a service is not accompanied by proper housing.

The importance of good staff morale as a service to children cannot be overestimated. Adequate, comfortable, and attractive faculty lounges, work rooms, and rest rooms help provide the physical conditions under which a staff can provide an outstanding educational program. The need for staff and personal conference rooms has been well established.

The importance of a library, resource center, gymnasium, and auditorium has also been recognized. These facilities are required as an integral part of a modern program of elementary education and without them, the building cannot provide for a complete learning program.

Provisions for Health and Safety

Ours is a society of "people on wheels." In selecting sites for school buildings, this must be kept in mind so that children can have access to the school along safe routes of approach. Adequate play space is another problem in our burgeoning metropolitan areas. Within the building itself, provisions must be made for comfort and maximum cleanliness, and for the elimination of fire and explosion hazards.

No school plant can provide a good educational environment unless it is both safe and clean in all areas of the building and grounds.

Multi-Purpose Facilities

Some principals and teachers have decided that what is meant by so-called "all-

purpose rooms" is "no-purpose rooms." The design of one room cannot be expected to be automatically compatible with several different functions which it is expected to serve. For example, conversion of a gymnasium to a lunchroom, assembly hall, or other purposes may involve so much time and become so involved that the school winds up not really having any one of the planned facilities. On the other hand, small soundproof rooms designed for instrumental music instruction might be used for individual testing purposes. Let's not try to fool anyone but instead make realistic studies which will show exactly which facilities can sensibly be made multi-purpose.

The elementary school is fast becoming the community center for a variety of purposes. Buildings must be planned for maximum use after school hours as well as during the day. If several community agencies will be using the building, all should have a part in planning health, recreation, library, and similar facilities of the school which will be used by the community.

Economy

Economy in building must be considered the responsibility of all who participate in the planning of a school plant. The record of expenditures for building elementary schools throughout the country is good. This has been shown in a number of recent reliable studies.

We must remember that genuine economy is not simply a matter of cost per square foot. Over a period of years, the cheapest building to construct may prove to be the most expensive if it is properly maintained. There is an abundance of visual as well as statistical proof to support this statement.

Many facets of this problem need careful study. Changes in laws concerning bidding procedures, simplified methods of construction, school building codes and requirements, quality checks during the construction process, studies of durability of materials in school building use—which often is quite different from their durability in industrial or residential use—all these factors and many others must be continually studied and changed in keeping with best practices in this rapidly changing field.

A Look to the Future

The responsibility of leadership in developing schools for this and future generations of boys and girls must be accepted by educators. Superintendents, principals, and teachers must join with educational research workers and educational thinkers to make certain that buildings become an integral part of the changing educational program.

Much has been accomplished over the years in learning about child growth and development, the psychology of learning, and teaching methods and aids. Much more will continue to be learned through research and experimentation in the years ahead. Those who plan the school buildings of the future must take this knowledge into consideration. They must accept the fact that the plants they build will have a long life, that the elementary school program will change, and that the ideal school has not yet been built.

The creative minds of all who have a part in building a school—children, teachers, administrators, parents, citizens, board of education members, architects, engineers, designers of equipment and materials—must be utilized to full advantage. Only then can our schools provide an ever-improving environment in which children can learn. We can be proud of much that has been done and much that is being done. We can and should have an even greater pride in what will be done.

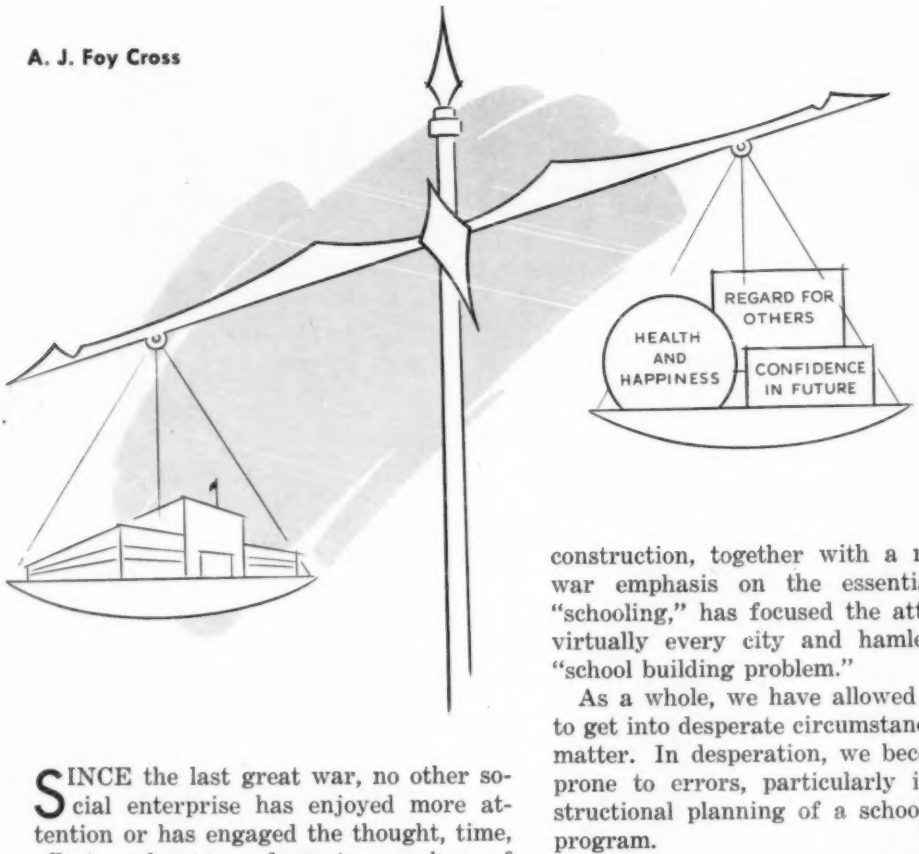
T

THE PLANNING PROCESS

Planning is a tool for translating the idea, "We need a new school," into blueprints and specifications. It should be a process of people working together as a team—communicating ideas, resolving differences, making decisions. The school that results will be no better than the planning that produces it.

Principles of Good School Planning

A. J. Foy Cross



SINCE the last great war, no other social enterprise has enjoyed more attention or has engaged the thought, time, effort, and money of greater numbers of our people than has this nation's program of building new school plants. The inexorable increase of population and a prolonged period when our building resources were diverted from use in schoolhouse construction, together with a new postwar emphasis on the essentialness of "schooling," has focused the attention of virtually every city and hamlet on the "school building problem."

As a whole, we have allowed ourselves to get into desperate circumstances in this matter. In desperation, we become more prone to errors, particularly in the instructional planning of a school building program.

This somewhat frustrating situation, in which we try to make up overnight for our failure to plan ahead, is further complicated by the climaxing at this time of other pertinent problems.

• There are not enough qualified teachers to go around, and probably no hope of getting a sufficient number to maintain traditional class sizes, a fact which *may make it imperative that school classrooms*

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be made larger and, in turn, *properly equipped for effective instruction of much larger class groups* than we have been used to in the past.

• Our procrastination in facing the issue has caught us unprepared to desegregate schools in many parts of the country, with the consequence that some communities are diverting over-all school building resources from public school construction budgets.

• A very large number of teachers in service are ill prepared to adapt to new school-community relationships, to an evolving curriculum and modern methods. In-service personnel improvement programs and, to a large extent, the pre-service education curriculum have neglected the preparation of teachers to assume a responsive attitude toward the inevitable changes of our society and to make constant adaptation to these changes. The result has been that many new teacher-architect planned buildings are inefficient compromises between the old and the new.

• We have been caught napping with antiquated funding laws and tax structures, so we find it difficult in many communities to channel an adequate share of our available resources into school construction.

• In most states, in the interest particularly of safety and standards of quality of construction, we have established school building "codes" to assure communities that bargain hunting school boards must buy a school which meets certain minimum specifications. School construction codes were intentionally "of the people, by the people, and for the people." However, as we have done with certain antiquated highway laws which were tailored to the potentials of a Model T, we fail to bring our now unduly restrictive school construction codes up to date, with the result that what once were reasonable standards or justifiable expediencies and precautions now present real bottlenecks in planning and construction.

• Prices have gone up — — —

• Etc., etc., etc.

These factors make the important and always demanding job of the schoolhouse planner vastly more complicated than ever before in history. How do those who plan schools under these circumstances meet the challenge of providing a building that will assure maximum learning for the children who use its facilities? How do they make certain that the building they plan will make it possible for teachers and other members of the community to bring to boys and girls the best that is known today about healthful environment and teaching techniques? How can they be reasonably sure that the structure they specify will not be so inflexible as to restrict the good learning of school-age children ten, twenty, fifty years from now? How do they overcome the undesirable influence of warm affections for the past and of vested interests in antiquated school procedures?

The success with which we seek solutions to such problems determines to a large extent whether we are to get our money's worth out of the schools we build. This volume presents examples of some of the measuring sticks by which we may roughly determine how well we meet such challenges.

Criteria for Judging Program

There are three broad criteria against which we judge the success or failure of the educational program for which we build schools in our modern society. A good or successful educational program means the application or use of all available learning resources within and outside the school for:

• Maximum personal, individual growth in health, happiness, and well-being

- Maximum growth among individuals of an active interest in the health and well-being of all other people
- Continuous growth within individuals of their learning skills and of confidence in their ability to recognize and solve the little and big problems of living in a satisfying and socially acceptable manner

None of these three objectives ever stands alone and none is to be neglected in planning a school plant. The products of our country's educational system, it is frequently proclaimed, are to be healthy, happy people with a regard for others and a confidence in their future. These three ambitions are the inseparable guideposts which together measure whether a school, or a teacher, or a home, or a community is doing a good job of educating its youth. No administrative policy, no course of study, no curricular or "extra-curricular" activity can be rightfully admitted as part of an educational program if it does not contribute to the achievement of these three goals. Likewise, no school should be built which is not planned to contribute in a maximal way to these ends.

A Community Problem

Of course, a youth's learning goes on wherever he goes. His "learning" and his "education" are not confined to school. He cannot escape the everyday learning experiences, good and bad, which go on every moment he is awake. In the modern community, the workshop of a youth's *directed learning* program is, however, the school. Here is the place where, under purposeful teacher guidance, young Americans work day by day at the big job of learning how to learn and where they practice the essential skills of living and working together.

Schools, it must be admitted, reflect the motivating philosophies and purposes of the community which builds them. If the members of a community really believe that such goals as good health habits are as important as arithmetic, their schools —the buildings, the sites, the curriculum, the methods—will be purposefully planned to assure each child that he will be healthier and happier for having attended them. If the community does not hold such a belief, it is entirely possible that a majority of the children may be less healthy and less happy because of their experiences in school.

It is a fact that such social ills as "juvenile delinquency" in its many forms have never been caused by the application of what is now known to be good modern educational procedure or good modern construction. There is much evidence that certain *antiquated* educational practices and poor physical school environments have been and are still contributing factors to the deterioration of health and behavior patterns in young people. Likewise, it is quite clear that deterioration from other causes, be they found in the home or in other outside areas of a child's experience, frequently may be checked and the damage remedied by skillful application of the latest techniques of education in wholesome physical surroundings.

Some have opined that many older schools, because of their foreboding structure and unwholesome surroundings, because of their poorly lighted and ventilated interiors, and because of their uncomfortably crowded facilities, have actually wreaked irreparable damage to young bodies and to the attitude patterns of young minds. Damaged eyes or attitudes can never be completely restored. At best, they may be covered up and adapted to, always at an expense far greater than the cost of original prevention.

It is the total community, then, which educates its youth. The school is a part of a community complex of educational forces. The schools which its citizens

build are but additional tools for accomplishing what the community desires in the growth patterns of its young people. If these tools are antiquated, intended for the school job of another day, if they are clumsy or ill-designed for the job of schooling in the mid-twentieth century, if they are, in other words, poorly adapted to the task which the community faces in preparing its young people for happy life in an atomic age, they are poor tools.

The community's school construction program, whether it involves one or one hundred new buildings or merely an addition to existing structures, is a community problem, not the problem of the superintendent, or the board, the teachers, and the architect. It is a joint responsibility and a rare opportunity for promoting desirable solidarity in the community. Good processes of community planning for schools are certain to be reflected in greater confidence among citizens in the democratic way of attacking other common problems of their civic and social life.

Defining the Problem

Those who would initiate and direct community planning processes must be aware, however, that relatively few of the citizens of a community, including the teachers, are skilled or even experienced in the effective group problem-solving techniques essential to successful community planning. Frequently, planning for a new school is the first opportunity parents and other senior members of the community have been offered to approach a common problem through group processes.

The community's school construction problem should be approached by careful definition. Defining the problem is not accomplished by the mere realization that there are not enough classroom spaces to go around. "A desk for every child" or "schools enough so that every child can attend full time" may not be desirable goals if the resulting desks or the extra classrooms are not good, healthful places to be.

Definition of the problem, experienced school planners say, must begin with a survey and analysis of the community's school needs. Such surveys and analyses, if the planners are to avoid the difficulties of "selling" their findings to the rest of the community, should be made with the active assistance of the people of the community and their recognized representatives. The results of well-done surveys and analyses, made by a true cross-section of the local community with the assistance of any necessary outside consultants, need no "selling" at voting time. Such self-surveys commit the community in a degree to carry out its own recommendations.

The survey and analysis step toward identifying a community's school construction problem involves the exploration of many preliminary questions. Why should we be concerned with building new schools? Don't we already have enough buildings? What's the matter with the ones we have? If we do not have rooms enough to go around, why not add a wing here and there to existing buildings to take care of the increased enrollment?

Will our school population grow or decrease? If it increases too much ten years from now to fit into present schools, why not let the future take care of itself? Why go on building schools? Maybe we are trying to educate too many "uneducables" anyway.

What kind of schools are we talking about building? What job must these schools do? What kind of a building and grounds must they have to do the job? Are we sure that somebody won't find a better curriculum and better methods? And then what—will our buildings be any good for the new program? Are we going to plan

for just enough to get by, or are we seriously going to try to see that we get buildings and grounds that are the best we can plan, for now and for the future?

Off the cuff responses to these questions by even a majority of the members of the community together with their professional teachers is not sufficient. Collection of data and deep probing of the facts are necessary to draw conclusions for the guidance of the board, the architects, and others who must make the important final decisions.

A school building project might be drastically affected by weighing additional facts beyond the cold statistics of a changing "population pattern." What, for example, do we know about the total educational environment in the several parts of our city? Should we avoid new school construction in the older parts of the city and concentrate our efforts and our building resources at or beyond the growing edge? Or is it possible that children of families in the older, more run-down neighborhoods are in the greatest need of the best money can buy in the way of school housing to compensate for crowded unattractive living and playing quarters at home?

Once the problem has been clearly defined and accepted by the community, the logical next step of the group process may be approached. How are we going to organize ourselves in order to:

- get and communicate the facts to all concerned?
- provide for broad participation in drawing conclusions?
- translate these conclusions into specific plans—for the land and site development, for the classrooms and other instructional areas, for the equipment and materials to be used in the new building?
- arrange for advantageous financing of the building?
- provide for constant critical evaluation at each step in planning?
- coordinate current building plans with the long-time plans for school-community development?

Getting the Facts

Many essential facts will have been gained in the important problem identification phase of a building project. Collecting even the most complete survey facts and figures about population and population trends will, however, be but a small part of the knowledge the community must have to make safe judgments concerning school building.

How are new buildings to be affected by a study of curriculum facts and what appear to be the instructional needs of young people who will live not only in our town but also in our world? Without essential knowledge, the widely accepted practice of letting teachers and parents draw up educational plans and specifications for a new building may be the surest way of creating an instructionally obsolete new plant which is unduly restrictive from the day it opens. Dedication only to immediate felt needs or to traditional ideas about curriculum and methods cannot help but result in a structure which is less than the best that can be built for the money. On the other hand, sufficient study of the real needs which must be met by a school and dedication to the future and the inevitability of change cannot help but result in a more efficient and lastingly effective school plant. Anything less than the best study and thought, any guidance in planning by those who hold ill-founded concepts and philosophies of education, must surely restrict in some degree the educational experiences and teaching practices of children and teachers of the future.

A careful study of present-day knowledge about how children learn and about

what types of school-centered activities help them learn better will inevitably be reflected in sounder decisions concerning the size, shape, and equipment of classrooms, the size, location, and development of the site, and the like. Architects avow that for the most part, teachers, as well as parents, are woefully lacking in precise knowledge of what is adequate space in a modern classroom. With much ready knowledge of what constitutes the proper dimensions and equipment for a swimming pool, school architects are frequently left without a thoughtful specification of how big or what shape a classroom should be to facilitate the most efficient and effective classroom procedures. Teachers and parents who are otherwise experimental in their approach to educational problems —such as curriculum planning, testing, and reporting—have generally overlooked the importance of applying this same approach in determining the optimum size and equipment of school rooms.

Providing for Total Participation

Boards of education and school officials occasionally experience the disheartening situation in which, working with a citizens committee, they have completed plans for a good, efficient building only to find these plans voted down as funding elections are held. This frustrating culmination of long months of planning may be and frequently is the result of a lack of effective two-way communication between planners and voters. School planning committees should be representative of their communities. Committee members, however, have the opportunity to weigh facts and draw conclusions from knowledge not commonly available to the vast majority of people in their community. Without these facts and the study which has culminated in the plans to be voted upon, members of the committee would be as prone to vote against the new school as any other citizen who casts a negative vote because he does not understand.

All this would seem to indicate that those who have the right and the responsibility of voting for or against a school construction proposal should have the opportunity to gain complete knowledge of the facts and reasoning which have produced the voting issue. This, in turn, points up the essentialness of constant effective communication between all who have responsibilities for the creation of new schools. There is no dearth of facts about how we can and why we should build better schools. But there is frequently both neglect and failure to communicate these facts.

Effective communication among all who are concerned with a community's school building program assures at least some degree of total community participation in the program. Participation, in turn, breeds a feeling of shared responsibility. Citizens who share the responsibility of planning for a school are not likely to vote against the financing of that school.

Translating Facts into Plans

From facts well understood come conclusions about or specifications of the needs which a new school plant must fill. At this point, the role of the school

architect becomes evident. It is a needlessly costly error to call upon the professional services of an architect before specifications have been formulated. It is not the responsibility of the architect to determine what purposes a school is to serve nor to make decisions about such educational questions as how much space must be provided in each classroom. His is the task of helping to translate the answers to such questions into construction plans.

From facts and studied conclusions there should also follow naturally the plans for supplying equipment and instructional materials which will facilitate the curriculum. Not infrequently, the program of an excellently planned school building is reduced in effectiveness because the community has overlooked or underestimated the essential role played by proper furniture, chalkboards, projectors, science equipment, reading materials, maps, and other instructional supplies.

This stage of planning for a new school presents the opportunity to arrange for any necessary re-orientation of the staff and pupils who will use the new building. Preparation of the administrators, teachers, noninstructional personnel, parents, and pupils to use and care for the new facilities may greatly enhance the overall value and effectiveness of the new building.

Financial Planning

Many otherwise well-planned building programs have deteriorated into uneconomical compromises for the simple reason that the less pleasant task of planning the financing was postponed until the architect's plans were completed and ready for bid. The big job of channeling an appropriate amount of a community's resources into education is not one that can be done overnight.

Working with the official board of education, a school financing committee composed of representative citizens may assist greatly in assuring a community that it cannot afford to be "penny-wise and pound foolish" in the matter of building for education. Assisted by such a committee, working not only with the facts of financial resources at hand but with a clear knowledge of essential educational needs, a community may avoid the direct money waste of buying and equipping a school on unfavorable markets and the indirect but more important waste of human resources which results from financially compromised public education programs.

Evaluation

Constant evaluation of the processes and temporary conclusions of those engaged in school plant planning is essential in the interest of economy of time as well as in measuring progress toward objectives. The simple expedient of continually evaluating the effectiveness of communication between special planning committees and the general public may reveal in advance the little misunderstandings which would otherwise become apparent only after an unsuccessful bond election. Similarly, frequent measures of understanding between local school planners and the state school building construction officers may assist the local group in clearing official code hurdles without delay.

Long-Time Planning

There is, after all, no such thing as a short-time school building project. The planning and construction of a single school building may be accomplished in haste, but the application and use stages of a school building extend throughout a lifetime. The results of the application

and use stages are effective as long as the building stands.

In a program for the development of a greater number of schools and school plants over an extended period, evaluation of the first stages of the total plan, plus a measure of the effectiveness of curriculum adaptations made possible by the new buildings, will serve as a valuable guide for future improvement. It is likely that a traditional neglect of evaluation of long-time plans in terms of their real cost has contributed to the perpetuation of many inefficiencies in the present-day curriculum, as well as to uneconomical practices in schoolhouse construction.

Many otherwise well-conceived long-term building programs have compounded initial mistakes or inadequacies by proceeding to subsequent construction without adequate evaluation of the first steps of the program. Many of the very real potential advantages of long-time planning may quite obviously be compromised if constant evaluation and adaptation is lacking.

Applying What We Know

In summary, let us recall that there is available to those who plan schools a vast fund of knowledge about how school buildings and school programs may be made more effective tools for the building of a better society. During the last fifty years, the great cultures of the world have been busy discovering and constantly applying improved ways of transportation and communication and of combatting the illnesses of man and his world. These same cultures have also been making great strides in discovering the mysteries of human growth and learning and what instructional patterns breed desirable behavior patterns.

The greatest of all hurdles in planning better schools is not a dearth of available knowledge but the common lack of effective processes for embodying this knowledge in the schools we build and in the curriculums for which we build. The difficulty experienced in attempts to apply the latest know-how of science to education constitutes a peculiar phenomenon of our otherwise science-minded society.

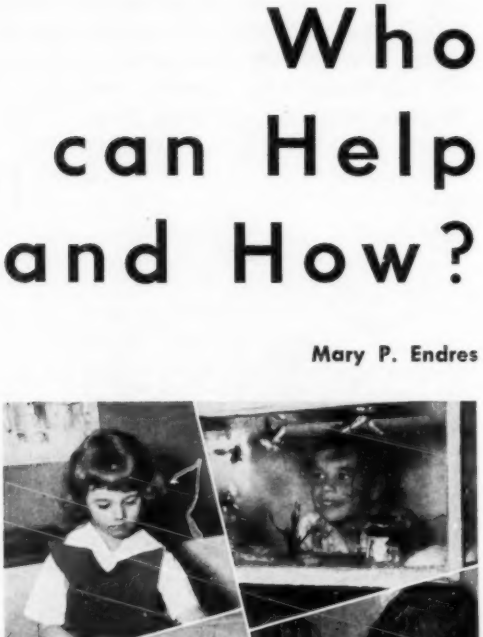
Few in our population question the use of the newest techniques to halt the onslaught of polio or tuberculosis. Most of us would resist a proposal that our communities use the old bucket brigade system to protect our homes from fires. Yet, amazingly enough, when it comes to the very vital problem of educating young people in the strange and complex ways of living a wholesome life, many people not only tolerate but actually promote a "bucket brigade" approach to education.

Where they grasp at each straw of scientific discovery in medicine and mechanics, these good folk may resist or totally ignore the millions of dollars worth of research findings and new discoveries in the sciences of education and human behavior development and affectionately foster many of the traditional ways of education common to the war and fear generating generations of past decades.

Perhaps the resolution of this dilemma will be brought about when the application of sound community group processes becomes more general.

School Planning . . . Who can Help and How?

Mary P. Endres



EACH child is his own special self. He is different from every other child in many ways. He is active, or he is quiet. His school building is part of his physical world and it should permit him to be both his "group self" and his very own self. He deserves this.

No one person completely knows another, least of all a child, but many people know about parts of him. The means by which these people pool their knowledge in a useful and effective way is the concern of this article.

Cooperative Planning

The title or position of each person in the group (even the elementary school principal's) is of minor importance. Insight is no respecter of rank or position. Leadership and decisively important ideas can come from any member of a group if an atmosphere of trust and sharing exists. Robert E. Anderson says that "cooperative planning is an honest search for truth," [1] to which may be added, a search shared by people whose interest is sharpened by responsibility, experience, and

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concern for the outcome and, preferably, who like and trust each other.

This involvement of many persons in the planning process is an outstanding characteristic of school plant planning today. Whether or not this wide participation results in better buildings depends on several factors: 1) expert leadership; 2) attitudes toward broad participation; 3) time and effort put into the planning process; and 4) an organized design for cooperative planning.

An "open-door" policy by the board of education, wholeheartedly believed in and supported by the superintendent and principals, is essential to extensive cooperation in planning school buildings. There must be actual participation in the planning process, not simply voting "yes" on bond issues, attending special meetings, or giving lip service to goals. Teachers, principals, parents, school board members, superintendents, and architects must sit down together and talk things over. This requires time, effort, patience, and understanding to harmonize the many personalities, the differing attitudes, and the varying viewpoints represented by all those involved. It may be a slow, often difficult, process. To create a warm friendly place where children will be happy and productive in their work and where parents and citizens will come is the goal which unifies the viewpoints of all.

Cooperative planning of schools is no magic cure-all, no wonder drug which will do away with all school problems once and for all. It is not a substitute for good school programs for children or for support of good schools by the community. Cooperative planning of school buildings has three broad goals: 1) to bring about a better understanding among parents, teachers, and school planners of what children are like and how they learn; 2) to bring about an understanding among parents, teachers, and school planners of what kind of physical environment is best for their children in their school; and 3) to make plans and recommendations whereby such buildings will be possible.

Who Can Help?

What persons have something to contribute to this planning process? Those who have direct responsibilities in planning school programs for children are most often mentioned: members of the board of education, the superintendent, the principals, and, above all, the teachers and children who will be the tenants of the building. Not to be overlooked are those engaged in nonteaching duties in the school, including the custodians, lunchroom workers, bus drivers, and school secretary. School people are learning to look to community members for assistance also. The butcher, the baker, the candlestick-maker—all have something to contribute and some, a great deal.

The architect is a key person in planning. The earlier he can be involved, the more he can contribute to the plan. "The personality of a building springs from the mind of its architect." [2]

There are also other persons who may be called upon, such as educational consultants from a university or a private corporation, specialists in certain aspects of building functions such as heating, lighting, and ventilation, or specialists in materials or equipment.

All recommendations must be ratified by the board of education and this should be established at the outset. Citizens, teachers, and children should understand that they have no legal authority. What matters is that their opinions are sought and respected.

Let's Get to Planning!

What, then, are the responsibilities of each of these persons and groups in the

planning process? Fine lines of responsibility are practically impossible to draw among all who have something to contribute to planning. Good schools do not just occur—they usually represent the teamwork of many persons.

Boards of Education

The people of the community are the clients in any building program and are represented by their elected or, in some cases, appointed members of the board of education.

The main function of the members of a board of education is to formulate policies which can be used as guides in establishing and maintaining a desirable school program. This includes designing the objectives of a school building program. In the long-range plan, there are many decisions which board members must make. These responsibilities cannot be delegated or evaded. However, other people may be invited to enter into this planning process. Here, in fact, is where cooperative planning begins. Unless the members of the board of education are sincere in their desire to involve people and to listen to their suggestions, it would be best not to attempt cooperative planning.

A board of education must grapple with fundamental problems. Shall we renovate or replace? What should be the capacity of the new building? Shall it be built in one unit or in stages? What is the economic potential of this district? What are the likely future school building needs? How shall we go about selecting an architect? Where shall the building be located? Should there first be a curriculum revision program? How shall the information be carried to the public? Should there be both a gym and an auditorium? And on and on.

The board of education must answer these and a myriad of other questions, either by their own efforts or with the assistance of others who share their concerns. Their continuous responsibility is to see that all the plans are incorporated into a workable scheme resulting in the best facilities possible.

Superintendents

The superintendent of schools often provides the leadership for cooperative planning, although leadership, too, may be shared. But the fact remains—cooperative planning requires expert leadership. How the superintendent works with people may well be more important than what he knows and what he does.

He seeks broad representation in planning: those who want new schools as well as those who do not want them; those who belong to organized groups—the American Legion, the PTA, the service clubs—and those who do not join organized groups; those who are parents and those who are nonparents; those who belong to various racial groups, economic layers, and social strata. He uses cooperative procedures in working with planning committees, helping them define problems, gather data, and make recommendations on the basis of study and facts. The superintendent has a tremendous responsibility in communicating, both with those engaged in the planning process and with the general public.

The school superintendent always works through constituted authority. He understands that he is responsible for carrying out board policies, not for making them. He sees great value in citizens groups and gives guidance to their efforts. At the same time, he directs staff attention to the task of determining what kind of instructional program best serves the youth of the community. He encourages them to look ahead, to dream of ways this program will differ in five, ten, or even twenty years.

Elementary School Principals

The elementary school principal is the leader within the neighborhood. Although the tone is set by the board and superintendent, the school principal is directly responsible for the atmosphere that encourages or discourages free participation on the part of teachers, children, committee members, and others. He must have a sincere desire to involve others in planning. Otherwise, a stilted relationship results and those who are invited to participate feel it is only a perfunctory chore.

The principal must be informed about the needs of boys and girls, good school programs for them, and good spaces for learning. He will want to enrich his own knowledge by professional reading, by enrolling in university classes, by attendance at professional conferences, and by consultation with many persons. This does not mean that he has to be a building expert. The planning process itself gives him an opportunity to learn with others.

Cooperative planning is not new to most elementary school principals. The principal often calls on others for assistance in developing practices which affect children. He may work with the teachers, the parents, and the children, individually or collectively. He is used to providing effective communication and means of sharing ideas among teachers or between home and school. Cooperative planning in the school and particularly within the classroom is encouraged. It is the principal's leadership which sets the atmosphere of mutual respect and confidence necessary for productive activity.

Teachers

The good teacher really knows children, interests them, and guides them while they learn. Teachers have much to contribute to planning, especially to the planning of instructional spaces. They are acutely aware of the philosophy behind the school system, the curriculum, and the equipment and supplies used. They have ideas about how space should be arranged to facilitate the instructional program.

Teachers, above all others, have the basic information which finally determines what kind of a structure the building should be. They know whether children only read one after another, taking turns around the class, or whether they read and dramatize stories, create plays, hold discussions, read aloud to others, read widely for information or just for fun. Teachers are informed about whether or not the science program includes experimenting, collecting and exhibiting specimens and keeping live plants and animals in the classroom. Teachers have ideas about the furniture which facilitates an instructional program—tables, types of student desks, easels, book shelves, work counters. They can describe the use or disuse of projectors and recorders, maps and globes, rhythm band instruments and pianos, chalkboards and display surfaces. They know about the appropriate size of things, how many are required, about storage spaces, and about the number and placement of light switches and electrical outlets.

Teachers are willing to spend time in helping to plan when they are assured that their suggestions will not be ignored. At the outset, it should be made clear that it may not be possible to act on all their

suggestions, but teachers can be helped to understand why this is so.

Custodians

In most cases, custodians do not have technical knowledge dealing with lighting and heating, but they do have some preferences and ideas developed as a result of practical experience and they like it when their advice is sought. They know about their own duties and the equipment and staff necessary to accomplish their tasks. They can give help in planning and locating spaces used to maintain a building. Custodians should have chances to visit with custodians of other schools and to work some with the architects and other school planners.

School Lunch Workers

In many elementary schools, the lunch program is an important part of the total school program. This is often the case where there are many working mothers or where children are transported to school by bus. Whatever the reason, when a school decides that it will have a lunch program, special planning is required.

In the past, size and arrangements for food preparation spaces, storage spaces, and serving and eating areas have largely been determined by counting the number to be served. However, service personnel in the lunchroom can contribute more than head counts in planning functional lunch facilities. They have first-hand information about the kinds of lunches prepared, the selection of menus, the variety of foods served, and the physical operation of the lunchroom. They can also suggest how lunchrooms can be arranged to promote a smooth and safe flow of pupil traffic. By the proper use of time studies and inventories, useful information can be obtained on location and sizes of work areas and storage spaces.

Consultant assistance can be obtained from special lunch supervisors in state departments of education or state universities and from private companies which sell equipment for large kitchens. Parents and teachers should also be included in planning this important aspect of the school program.

School Secretaries

Because the school secretary is usually the first person contacted by parents or teachers, she is vital in the administration of the school. This valuable assistant should have the best possible working conditions.

The secretary, herself, is a key person in helping to plan, equip, and arrange her working area. It becomes her responsibility, along with the principal, to furnish information regarding the extent and nature of making duplicated materials, the amount and kind of records which are kept in the central location, and information about which records are temporary, permanent, and confidential. She knows about needs for vault storage for permanent records or for lunchroom or textbook money. She knows something about requirements for a waiting area for both children and adults.

Pupils

Since the school exists solely so that children may be educated, those who plan schools need to know a great deal about children and what they do in school. Much of this can be realized by bringing children into the planning process.

Children can work with their teachers in describing all the kinds of things which go on in their rooms—reading "to find out," reading for fun, writing letters to friends, learning to make a "k," writing new words in the day's news, making a time line, preparing a mural to show what the grocer does with the money he gets for a loaf of bread, singing a song

about the brook, dancing, learning to subtract, studying, keeping a weather record, building a pen for the white mice, locating far-away places, and on and on.

Moreover, they may have certain notions about color, about textures and materials, about physical comfort, about letting the out-of-doors inside. Children can to a great extent help create their own school world.

Community Members

Many members of the community have much to contribute to planning. This is an opportunity to use those with special abilities. Doctors and dentists have ideas about health centers. The police and fire departments know ways to avoid accident and fire hazards. Bankers, insurance agents, businessmen, and realtors know about interest rates, the availability of building sites, and population trends. The press and radio can help in disseminating information.

Mothers know that children's wraps get wet and must hang where they can drip, that toilet rooms should be in a handy location for young children, and that boys and girls will learn better if they like their school. Schools are for their children and in effect represent the age-old longing of parents for good things for their young. When given the opportunity, encouragement, and leadership, they are willing to work in many ways for good school facilities.

Architects

The architect must have the willingness to cooperate in the planning process. But willingness alone will not insure good schools. There is no substitute for superior skill on the part of the architect. He should be involved in the planning process to the extent that he becomes completely informed about school philosophy, the instructional program, the fundamental policies of the board of education, the economic potential of the community, the number of students and teachers to be provided for, community uses of the building, and future needs. But, above all, the architect should receive incentive provided by intelligent, sensitive, and appreciative clients.

Staff Planning

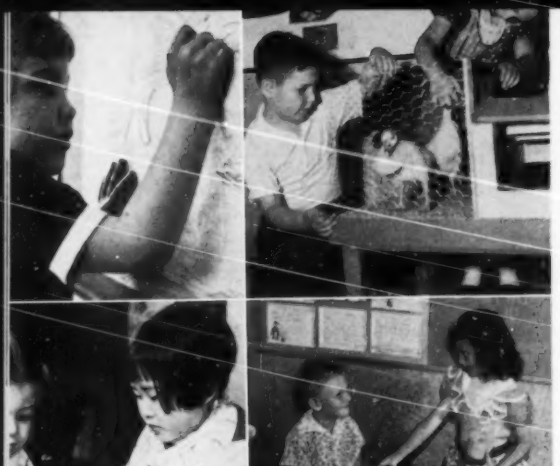
The elementary school principal is in a leadership position. His duty is to organize and plan the work to be done to reach certain goals. He may do this by making all the decisions and deciding on all plans of action, or he may work with his staff and others to encourage and develop group participation in decision-making. It is an underlying principle in this book that the latter process is by far the better. Better facilities are likely to result from the guided and considered thinking of many, especially those who use the buildings, and better use will be made of facilities when those who use them help in planning.

The nature of this process has certain characteristics.

Planning is carried on with certain goals or purposes in mind. Free expression and group thinking are essential to the establishment of group goals.

Planning includes establishing a comprehensive process for attaining the agreed upon goals. Decisions should be made about who is to be involved and what responsibilities each shall have. A time schedule should be set. The planning should center on the details or action needed for a successful realization of the goals. The principal must be aware of how much responsibility his group is able and willing to take and whether or not the teachers have time for planning.

The principal may assist by instituting a curriculum evaluation program, locating



The classroom is a busy world—filled with the many and varied projects of childhood

books and articles for study, identifying resource persons, acquainting personnel with new trends in facilities for elementary schools, or arranging tours of new buildings.

Planning must be evaluated. It is not enough to formulate objectives, plan an action program, establish responsibility, and set a time schedule. Plans must be periodically and continuously scrutinized to see how well the group is accomplishing its task.

Such questions as these may be asked. Have we gathered all the facts? What are the alternatives? If we cannot have workrooms adjoining each classroom, what kind of work space within the classroom will be second best? Should classrooms all look alike—for small children and older, for Miss Brown and Mr. Black?

What Are Educational Specifications?

What kinds of information does the architect need from the school in order to design facilities to meet needs—to translate school program into design? "The greatest waste in school construction in recent years results from the lack of sufficient attention to the first step—educational planning. Even where educational planning is considered important, it is not usually carried to the point of preparing a detailed description of the educational program to be housed in the building." [3]

Educational planning does not include scale drawings of rooms, corridors, and other spaces. Educators are not contributing fully in facility planning when they suggest that concrete block is better than cinder, that rubber tile should be used in corridors in place of asphalt, that a specific heating system should be used, or that light switches should be placed 48 inches from the floor. But they are fulfilling their roles when they communicate effectively to the architect the characteris-

tics of the users of the building and a description of the aims and procedures of the educational program.

There are many kinds of information which the architect needs to have from the school in order to design facilities that will implement the school program. He needs to know if it is a "sit-and-study school, front and center," or if it is a school where children can think, study, and discuss matters of interest and importance. He needs to know how the school feels about books. Is a single textbook at a given grade level used in each subject, or are there several textbooks in each subject with varied reading difficulty? Space and storage must be planned with the use of books in mind. Should the room have a space where children may go to read for pleasure, for information, to engage in independent reading activities? Do magazines and newspapers come to the classroom? How many, what kind, how are they used?

Should the room be planned for group activities in science, social living, the arts? What kind of group experiences go on in these subject areas? What kind of group experiences, if any, are carried on out-of-doors?

What quiet activities go on in these classrooms? Do they include listening to poetry, music, a bird outside the window? What might children create in this serene environment? A story, a painting, a poem? Are rest provisions important in this school?

Does this school believe a child's treasures are important—a fossil from a nearby gravel pit, a chrysalis brought in from the woods, a picture postal card from Japan? Basically, shall the curiosity in children be nurtured, the doors to the world of beauty and wonder opened wide? Should space be planned for a terrarium, an aquarium, a magnifying glass?

What kinds and how many things will be displayed on bulletin boards? What use is made of maps, globes, and charts, and in what grades? Will filmstrips and films be used in classrooms?

What noisy, vigorous activities go on in this school when children are allowed and encouraged to "blow off steam"? Where are these activities carried on—in the toilets and corridors or in planned play areas both inside and outside? What is to be done for the child who is injured, who is tired or becomes ill?

How does this school provide for the child who is different? The mentally handicapped? The mentally gifted? The artistic one? The lisper or the stutterer? The child who has cerebral palsy? The shy one?

Does this community think teachers, too, should have their own spaces for rest, a cup of coffee, a pleasant chat with coworkers, a work space to prepare materials, a place to confer with parents?

What supplies are stored in the classrooms? What size paper is used? Should there be central storage space in the building? If so, for what and how much?

The architect needs to know about the programs in special curriculum areas—music, art, physical education, science, modern language, special education for atypical children. He needs to know about the special services such as hot lunch, transportation, or health services. He needs to know whether this school wants books housed in a central library or disseminated among the classrooms. Information about whether or not the school is used by groups for other than school purposes, what groups, and for what purposes is needed.

Answers to these and scores of other similar questions go to make up the educational specifications for any given school. The continuing search for answers should be accompanied by satisfactions of an abiding nature for all concerned and a better knowledge of what the buildings children work in should be like.

People and Program . . .

Background for the Architect

William M. Peña

THERE is a significant gap between the educational program and the design of facilities to house it. This gap must be filled by the work of the educator-architect team. It is at this important point in the planning process that the basic concepts for the building are determined. It is here that communications between educator and architect should be at their best in planning a school.

A good set of educational specifications will go far in providing the architect with the information he needs, but there must be opportunities for him to question, to probe, if he is to understand fully those major educational concepts which will shape the building.

It must be understood that an architect's design solves, or attempts to solve, problems posed by the program, the site and its climate, and the financial plan. Here we are concerned only with the program. But before he can solve problems, the architect must be able to identify them. This prerequisite to good design is called *programming*.

What else is the architect looking for during the process of programming? He is looking for educational-architectural concepts. In teamwork, it does not matter who derives these concepts, the educator or the architect, as long as they are sparked by the educational needs of children. The architect must be able to recognize an unusual educational-architectural concept when he sees one. This is not always easy. It is his responsibility to delve, to interpret, and to bring to the surface the big educational concepts that will have architectural implications. And that is sometimes most difficult when he is confronted with countless details.

At this stage, then, the architect is not seeking solutions; he is trying to identify problems. He is not interested in construction details; he is trying to establish design objectives. He is not after a mere list of spaces. This is a poor source for inspiration and has little to offer in the problem-solving approach to architectural practice. Besides, the need for the number and kinds of spaces is obvious enough not to be overlooked.

What, then, are the kinds of information the architect needs before he can consider possible design solutions?

1) He needs information about the big picture of the educational plan.
2) He needs a description of the educational program—the activities and procedures to be carried on in the building and on the site.
3) He needs to know as much as possible about the people to be served by the school—mainly children.

The architect seeks information concerning aims, methods, and people.

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Aims: Start with the over-all program considerations. Remember that the school must function as a whole before its many parts can be truly effective. Recognize the language barrier between educators and architects. Simple, truthful statements without high-sounding words are in order.

- What are the educational goals established for the school?
- What is the educational philosophy in terms of the learner, the learning process, and the learning situation?
- What are the general characteristics of the curriculum?
- What relationship will this school have with others in the system?
- What is the general atmosphere to be created by the building and its surroundings?
- What are the characteristics of the community?
- Will the school be the cultural center of the community?
- Is future growth to be expected?

Methods: Information concerning activities and procedures is much more important to the creative architect than the location and exact number of square feet of tackboard. Scrapbook pictures of facilities in other schools are a total loss without knowing the reasons of use behind their design.

- What teaching methods will be used?
- Can other methods be anticipated?
- What types of activities will be involved in instructional and (so-called) noninstructional spaces, both indoors and outdoors?
- What affinities are essential and desirable between spaces?
- How will the children be transported?

People: "A good school not only fits its community's educational goals; it also fits its tenants—principally children, who are different from adults in many subtle and surprising ways."[1] The creative architect is interested in children as his real clients. He wants to know as much as he can about them—how they differ from adults and from other groups of the same age. Questions may even concern behavioral patterns and ethnic groups. Chances are he will question the children themselves.

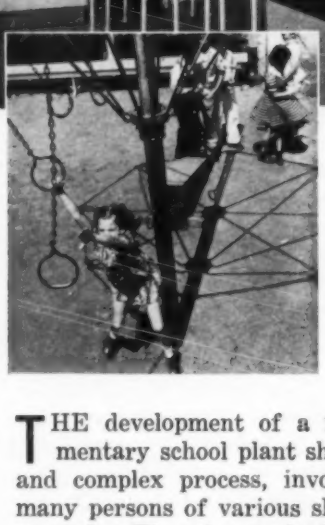
The architect is concerned not only with the physical environment in which children will live and work, but also with the emotional environment. One observant educator added to his description of kindergarten children: "These are little people. Because of their small size, they are always looking up in the adult world. Occasionally, they like to look down from small heights." This statement brought to mind two other educational factors and sparked the educational-architectural concept of a particular split-level classroom.

- What are the characteristics of the children?
- What sizes and kinds of groups will be housed in the school—both now and in the future?
- What will help the teacher to retain a creative and imaginative approach to his work?
- Will parents be encouraged to visit the school, the teaching spaces?

Undoubtedly, the architect needs other information, particularly in the realm of details. But information on aims, methods, and people will lead to the big planning concepts. After these are established, the flood of details that must follow will not cover up what is real in planning. Starting with details, or considering them too soon, may cause something important in the over-all considerations to be missed. Identification of the over-all problems, the big concepts, must come first. Only in this manner can the school as a whole be expected to be more than the sum of its many small parts.

Henry J. Rissetto

Communicating Educational Needs to Architects



THE development of a functional elementary school plant should be a long and complex process, involving a great many persons of various skills and backgrounds. Time is required all along the line—from early dreams to final construction. When completed, the result should be a physical manifestation that will effectively help to implement the educational concepts of both educators and citizens.

Too often, the final result does not measure up to expectations. The new school plant reveals inadequacies—the result not of budget limitations or lack of materials but of a breakdown in communication among those concerned with the building program.

Communication—Effective or Assumed?

From the time it is decided to build a new school to the time the building is occupied by its first group of pupils,

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literally thousands of decisions must be made by a large group of persons. Each decision plays a role—small or large, positive or negative—in determining the eventual effectiveness of the new school building.

We shall assume that regardless of the nature of the decisions to be reached or the professional or lay persons involved in reaching them, ideas, concepts, and intentions must be transferred from one person to another in order for them to be implemented in the new building. The importance of effective communication in this process—continuously and all along the line—cannot be overemphasized. Even when this transference of ideas is between persons in the same profession, the possibility of misinterpretation is present. It is even more likely when the communication is between persons in different specialized fields.

Transference of concepts through verbal or written media is strongly dependent upon the ability of those involved to use and understand the same language. We readily assume that possession of a basic language results in mutual understanding. What is not self-evident, however, and what actually causes a serious gap in the planning process, is the wide variation in *direct meaning* which various professions assign to the same terms. Each profession has its own "jargon."

As an example, consider the word "area." In educational circles, it is common practice to speak of the "*area* of social studies" or the "*area* of elementary school administration" as a part of the broader field of education. In an architect's professional vocabulary, "area" has a distinctly different meaning. He might very well think the educator was talking about space allocations for social studies or for elementary school administrative offices.

While this example is oversimplified, it does illustrate a possible stumbling block to communication. It is imperative that the educator, in his role as a member of the planning group, temper his often overdependence upon uniquely professional words, phrases, or terms. He must make a conscientious effort to express his educational ideas, concepts, and desires concerning the physical plant within the communication framework understood by all other members of the school planning team. The educator's failure to communicate effectively in a common framework seriously lessens the probability that the new school plant will meet educational specifications, no matter how arduously or sincerely they may have been developed.

Language of Architectural Drawing

Closely related to the problem of communication is the failure of members of the planning team to prepare themselves for working with other professionals. The architect and builder must have some understanding of educational terms; the educator must become familiar with the basic language of architecture and construction.

Long ago, architects realized that the thousands of features, dimensions, and characteristics of a structure could not be conveyed by word of mouth to all those concerned with the construction of a building. The need for standard description and direction in the absence of verbal command eventually brought about what are referred to today as architectural and/or engineering drawings. Through the years, these drawings have become more and more standardized in terms of drafting techniques for representing architectural or engineering features, dimensions, and characteristics. Drafting techniques employ symbols and lines to convey specific meanings. Their significance to those who use them is comparable to the significance of the alphabet in relation to the printed word.

These symbols and lines, reproduced as blueprints or as today's more common black-on-white prints, represent the language of design and construction. The educator must become acquainted with this language to some degree if he is to render critical judgment on the design of a school building. Very few educators can or should be expected to "read" in detail architectural and engineering plans and specifications. It is just as true, however, that educators, when directly involved with a school planning project, should cultivate a "conversational familiarity" with architectural and engineering drawings.

Perhaps the situation can be compared with that of an art lover, purchasing works of art at an auction while wearing a blindfold. Could he depend entirely upon the auctioneer's descriptions of the paintings? Obviously, it would be better for the purchaser to be able to see the paintings for himself and thus determine his own reactions—as well as those conveyed to him by the auctioneer.

Thus it is that another gap in the planning process often occurs. The educator lacks the background with which to evaluate the blueprints in terms of the educational specifications. Without this ability, he must rely upon conveyed assurances which, no matter how sincerely intended, depend on something different than the insight and reactions of an educator's own sensitivities.

The need, of course, is for familiarity with architectural and engineering drawings, rather than a draftsman's or building contractor's technical skill in reading design layouts and specifications. There are a number of simple and effective devices to help the educator achieve this objective. For one thing, there are good handbooks and workbooks available on how to read blueprints which have been written for beginning students in mechanical drawing. In some school systems, there are industrial arts teachers and supervisors who can help orient their colleagues in a series of special work conferences.

In most school planning programs, there are school architects who understand many phases of the educational program. This is reassuring—but it is not enough. There must also be educators who have acquired even a beginner's ability to "read" a drawing. Such an educator can be instrumental in helping to make sure that the plans actually provide the space, relationships, equipment, and other environmental factors necessary in a modern educational building. The inclusion of elaborate directives in educational specifications is no guarantee that in the long line of production through architect-designer, draftsmen, and specification writers to builder the desired educational plant will emerge. To participate is to contribute and failure to contribute be-

cause of inability to "read" the recipe makes each participant no less guilty if the product isn't palatable.

Dynamic Factors

One measure of a good school building is how well it interprets and provides for the numerous and diversified teaching and learning activities which take place within it. This is the dynamic factor in school plant adequacy, as differentiated from its static aspects.

A school is many things to many people. To an architect, it exhibits the static elements of symmetry or lack of symmetry, mass, form, balance, color, and other spatial, thermal, visual, aesthetic, and sonic environmental characteristics. To a superintendent of schools, the building exhibits a receiving district, a capacity, a staff, an operating budget, and other educational characteristics. To the principal, the school building has a dynamic quality because it represents grades, children, classroom teachers, and specialists. The school has a live, active, ongoing quality because many people are doing many things within it. These different activities are partially coordinated, partially spontaneous, structured and unstructured. To the school administrator, the school plant is either a convenient, easy-to-use tool or it is a cumbersome and congested building. Generally speaking, most schools tend to fall somewhere between these extremes.

When a school plant falls short of the mark, the difficulty usually lies in the generalized and broad descriptive language of educators which has failed to convey the dynamic needs of the educational program.

Need for Specifics

Specifications prepared by educators are often laced with comments such as "adequate storage," "adequate display area," "multiple use," and "activity program." These are not specifics! They serve little purpose in bridging the gap between the educator and architect.

The school administrator, living day by day in a school environment, knows almost instinctively what is required for the teaching and learning activities within a school. Along with each member of the teaching staff, he is an observer and a practitioner of the dynamics of a school plant. The members of the school staff are in the key spot for pinpointing the educational functions which must and should be provided for in a new school building. It is not enough, however, to describe these educational functions only in general terms. Oft-resorted to generalizations make the new school project vulnerable to a wide leeway of interpretation in such things as "adequate storage." Architects and engineers are professionals, skilled in structure, design, fabrication, construction, and installation. They are not "on-the-scene" educators.

There are numerous building materials and techniques for fabricating schools. These are architectural responsibilities. By the same token, there is closed storage,

A classroom equipped with a variety of built-in facilities for storage and display

Many types of storage are needed

open storage, deep-shelf storage, shallow-shelf storage, horizontal storage, vertical storage, storage racks, storage bins, storage compartments, storage cabinets, upper storage units, lower storage units, lockable storage, unlockable storage, file-type storage, wrap storage, out-of-room storage, damp storage, dry storage, movable storage, portable storage, built-in storage, and on and on. These are educational responsibilities.

This example of "adequate storage" illustrates the many interpretations which can be placed on a term educators might think appropriate to include in specifications. Educators cannot slide over the specifics if they want new buildings to be adequate for educational purposes, to provide for the dynamic factors which condition its usability.

Making a Study of Requirements

To offset these vague generalizations the educational planners, including classroom teachers, should make a conscientious study of their needs. They must make complete inventories of the usual and necessary functions which they desire in their teaching and administrative responsibilities.

To continue the example of the storage requirements of a school, the administrator could initiate a program wherein each member of the school staff would prepare a detailed description of his unique storage needs. Naturally, these will differ substantially since there are specific needs for kindergarten, primary, lower, and upper elementary instructional classrooms. There will be specific needs for each special facility, such as the library, multi-purpose rooms, gymnasium, and homemaking, art, and shop rooms. Added to these are the peculiar storage needs of administrators and custodians. There are indoor and outdoor storage requirements for playfield or grounds maintenance equipment.

Each person should elaborate in detail what he stores, how much he stores, how often it is used, how large it is, its best location, and the unique requirements in terms of both use and storage. Only in this manner can the administrator collect, analyze, and develop the specifications to which the architect can apply his design and fabrication skills.

Detailed analyses must be made of such educational necessities as chalkboard requirements in different types of instructional units; display needs of both tackboard and three-dimensional types in instructional units, corridors, and lobbies; work-counter surfaces and water supply; self-contained or gang-type toilet facilities; clothing and boot facilities; and many other feature and equipment factors needed for a modern school plant.

Of major importance is the administrator's role in detailing considerations with regard to circulation, access, egress, and playfield traffic. Specifics concerning certain grade groups and their unique playground requirements should be pinpointed. It is not enough to give the architect a note that "adequate playfield areas should be allocated for various grade groups." Only specifics will guarantee that the completed school plant will implement contemporary educational ideas and techniques.

Spatial Awareness

Factors involved in the conditioning of spaces for education include spatial, thermal, visual, sonic, and aesthetic. It would be difficult to overstate the importance of properly dimensioning and conditioning the spaces provided in and around school buildings. Upon the successful treatment of enclosed spaces and related areas depends not only the degree of safety and comfort provided for pupils and teachers but also, in a substantial measure, the educational usefulness of the plant and the efficiency and economy of its operation.

The design for achieving adequate and economical conditioning of educational spaces must be developed by persons who are specialized in each of the major fields involved. One crucial problem in good planning is to be alert to and guard against the disposition of each specialist to overdo —or underdo—his particular field. Balancing the requests of the specialized fields is one of the most important responsibilities of both administrator and architect.[1]

Among the conditioning factors is the sizing and dimensioning of the educational spaces. Discussions of school buildings insist that it is "penny-wise and pound-foolish" to make a substantial investment in land, structure, and enclosure, and then install cheap equipment for ventilating, heating, and lighting. It is equally, if not more, absurd to reverse the emphasis and provide good quality heating, ventilating, and lighting equipment for spaces that are inadequately or improperly sized, arranged, and equipped for educational services.

The basic justification for providing both proper spaces and adequate conditioning depends on the extent to which

they provide maximum readiness for teaching and learning and facilitate the educational program. It is not a question of whether it is more important to make comfortable than to educate. The unique contribution of the school plant, as differentiated from the home or other places in the community, is not its safety and comfort but its spatial suitability for the educational program.

School design has at times been controlled by the minimum area required to seat a pupil and provide aisles for emergency egress. This point of view is justifiable only in a closely regimented educational program where reading, writing, figuring, reciting, and listening are the only activities of pupils. However, substantially more than minimum seating and passing space is required in educational programs where individual differences are considered; where teachers often consult with pupils at their desks; where there is a wide range of group activities; where a great variety of materials are used and stored; and where the unique educational abilities and opportunities of each pupil are important considerations and are provided for.

It should be pointed out, however, that size alone is no guarantee of effectiveness or increased educational performance. If this were true, today's 300-horsepower automotive engines would be proportionately larger than their 100-horsepower predecessors, which they are not. Space is cost. It behooves the educational planner to spend space wisely and effectively lest he deserve some of the current criticism about the costs of modern school buildings.

Architects and educators display different sensitivities to the problem of space requirements. What would seem "adequate" to one might be far from adequate in the framework of the other. The architect should have skills to plan a space so it effectively facilitates the activity which it was designed to serve. By subtle techniques he can give the illusion of space, just as he has techniques which give the illusion of lack of space. Space is his business.

To the educator, space is a deceiving thing since this is not his everyday stock in trade. He must be alert to the limitations of his own thinking about space and pool his knowledge of the educational program with the architect's skill in designing space to implement it.

Use of Planning Guides

Many educators, when planning new facilities, depend on various guides from state or federal agencies for their basic space allotments. They make little attempt to ascertain whether these allotments are sound, penurious, or extravagant when considered in the light of the educational program in their particular school district. There is no more justification for school planners to accept space allocation standards without experimentation in their own situation than there is for them to accept a pre-arranged, prescribed curriculum. Local tailoring must be brought into action to enlarge, reduce, or otherwise alter space standards so as to make them fit the community.

No agency has prepared standards with the intention of crystallizing the spatial factor in educational facilities. Most guides are developed with the intention of maintaining sufficient freedom for building designers to use their ingenuity in developing their plans to fit the detailed needs of the local school and community. Too often, minimum standards which were established as safeguards against too little space and as aids in the advancement of good educational practices have become maximum practice. When planners follow the letter of these standards, they often miss the spirit of functional planning for specific needs.

Most planning guides should be used to emphasize principles and goals of planning. A number of state guides and school planning codes now stipulate space allotments as guides to experimentation and research. They are not absolute formulas for present space allotments and they certainly should not control future educational programs.

Geographical sections of the United States seem to have regional feelings concerning space allotments. Yet their descriptions of their educational programs and related activities have nationwide similarities. This would tend to indicate a lack of what might be termed "spatial awareness." Size, proportion, and dimension of physical facilities are not the usual forte of educational planners. However, this by no means absolves them from their responsibility to treat decisions regarding the allotment of space for the instructional program as crucial.

Experimenting with Space

Plant design in industry often has been based upon trial and error. The educational planner usually does not have an opportunity for mock-up or pilot study experimentation. A few very successful school planning projects have made wide use of a simplified mock-up procedure in testing spatial adequacy. After identifying the teaching and learning activities to be housed in the new educational facility, an extremely valuable undertaking would be to build models in a gymnasium or on an auditorium stage. By using tape or other temporary floor marking devices, numerous perimeters and shapes can be tested for their efficiency and convenience for pupils and teachers.

Such experiments have gone far to justify allocations of space in classrooms, special facilities, and other complicated layouts such as the administrative suite, cafeteria serving lines, and dining room. Mock-up research on space, proportion, and layout, developed in conjunction with the architect-designer, has never failed to result in more effective educational units. One reason for this is that the dynamics of circulation, access to desks or seats, egress, and traffic patterns to wardrobes or storage walls can all be tested in action by pupils and teachers who will occupy the new school facility.

In many instances, of course, it is not possible for the school planner to conduct such experimentation. But it is an idea to keep in mind.

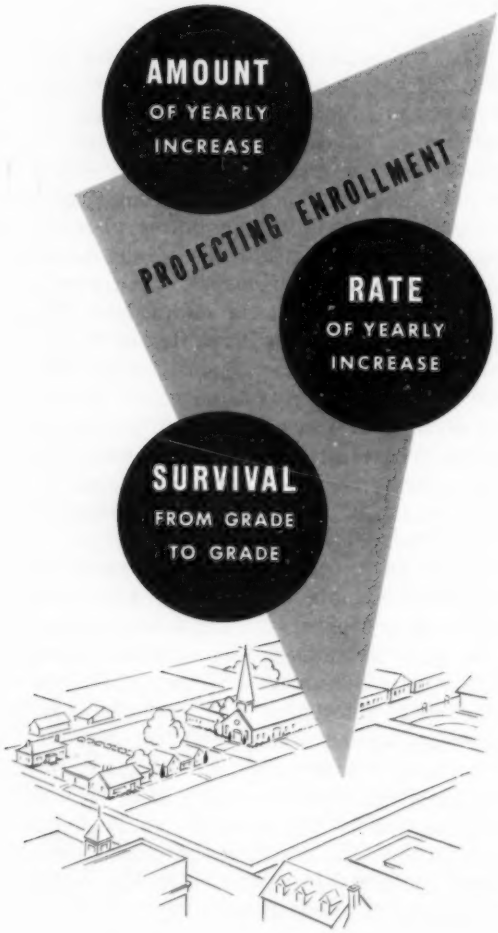
In Summary

For the educational administrator involved in a school planning project, the greatest pitfall is for him to expect to participate effectively and positively in school building planning when he relies on only his professional educational background. Except in rare instances, he must move himself and those for whom he is responsible toward broader backgrounds in verbal and graphic communication. He must go deep into determining, in terms other than generalities, exactly what educational functions are to be provided for. He must treat space, size, and dimension as familiar things because through experimentation under simulated conditions he has come to understand the dynamics for which the space is being provided.

Participation in a school building project involves more than simply attending planning conferences with fellow educators, architects, engineers, and members of the lay community. If a principal is to participate effectively and creatively, he must go beyond the superficials and develop an understanding of space and of architectural drawings. Only then will he be equipped to communicate successfully with architects and provide the educational insight essential to the designing of a good school building.

Early Stages in a Building Program

Lewis A. Wickens
Robert Patton
Paul Lockhart



AMONG his many responsibilities, a school principal must keep a close watch on trends in growth of enrollment in his school. His office should constitute a reliable source of information relayed to other school authorities well in advance of critical housing needs. Growth patterns are widely varied. The uptrend, in one instance, may be so gradual as to create a false sense of adequacy in housing. In another instance, it may hit with the near frantic impact of burgeoning subdivisions.

School districts, depending upon their size and the scope of their special services, keep careful records of community and area growth and are thus able to predict with reasonable certainty necessary expansion for a given period. The time element is a critical factor, for it takes considerable time to plan, to finance, and to construct new schools or additions. The public in general may not realize the time required.

Construction needs may stem from any or several of the following sources:

- Sudden shifts in population
- Increase in birth rates such as has followed World War II
- Tendencies toward change in the age of a community's adult population—a community with an older married

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population tends to have fewer children of elementary school age
- Reorganization or consolidation of school districts
- Important shifts in the basic school program that extend school services to new areas: for example, kindergartens, libraries, cafeterias
- Replacement of obsolete or substandard housing

Whatever the reason for growth or change, the awareness of needs and their timely presentation to the public is a responsibility of educators. Regardless of what may be considered a community's attitude toward expansion or its voting record, administrators are obligated to make housing facts clear within their best combined judgment.

Building Obsolescence

One of the benefits of growth is that it allows the design of many new schools to fit the educational program. Gradually, in many communities, school populations are benefiting from such adaptations, but there remain and will continue to remain buildings that have served for a half century or more. Some have been repainted or even replastered, to be sure, but they are often hazardous landmarks of a different era.

Their removal is normally a subject of great controversy within the community. Regardless of age, these buildings are more likely to be worn out educationally than physically. Accordingly, each school plant should be subjected to careful evaluation to determine how well it can meet the demands of present-day curriculums.

From time to time, it is essential to consider certain key questions:

- Is the bulding structurally sound?
- Is it physically safe and healthful?
- Is its location such as to be unsound economically?
- Is it large enough?
- Are the grounds cramped?
- Does it impose instructional handicaps for children in attendance?

Selecting an Architect

The selection of the architect should be made with care. The first step should be to secure the names of people who have done satisfactory work for other districts. Their performance elsewhere is a good basis for recommendation. Professional standing and qualifications of architects should then be checked with architect organizations and public authorities.

It is important to visit schools designed by the architects under consideration. The design and construction of the buildings and their educational features should be examined carefully. One's own taste should not play too large a part as to the "looks" of the building or units in question.

The administrator should spend time studying the educational function and arrangement of buildings. He should consult with staff members who use the buildings and, if possible, talk with them about the architect's understanding of school problems. An architect's ideas are to be respected, but they must be directed toward designing schools that are adapted to educational requirements. The school architect must be both a good listener and a student of modern school functions and programs.

If several architects seem to be equally qualified, then arrangements must be made for a series of interviews. This process can become complicated and awkward, however, if too many applicants are interviewed before selection is made. In larger districts, it is not uncommon for work to be rotated among several architects whose performance has been tested through previous assignments. At the same time, however, it is not advisable

to rule out new architects who apply for school work.

Be certain to inquire about the mechanical and electrical engineers recommended by the architect or contractor. The greatest difficulties encountered in the operation of a school plant often center upon shortcomings or "bugs" in mechanical and electrical design and installations.

As a final step, a prospective architect can be requested to show working drawings of previous projects so that they may be studied for accuracy of detail.

Everyone should understand that the architect is employed as a specialist in the design and development of building plans, with the school administrator's role that of interpreting the program. In this sense, it is imperative that the architect and the administrator work closely together so that the skills of each may be combined to produce schools that are practical and effective.

Predicting Future Enrollments

In any growing community, master planning for schools can be carried out only after much thought and study have been directed toward estimating the ultimate size and population of the school district and identifying where concentrations of population will be located within the district. The study must necessarily include a consideration of present and future zoning with regard to residential, commercial, and industrial areas in order that the ultimate population estimate will be as realistic as possible. The estimator will determine the potential number of houses which will fit on all undeveloped residential lots and land according to present or proposed future zoning, and then convert this number of houses to the number of people who could be accommodated, based on current family size as determined by government census statistics.

Once the ultimate population of a district is established, the corresponding elementary school enrollment can be predicted by applying to the ultimate population figure the ratio of current elementary enrollment to current population as established by local or national census data.

In any planning for the expansion of a school system, the amount of possible growth is relatively more important than the actual rate of growth. For long-range planning, the ultimate size is more significant as a basis upon which to make sound decisions than is the anticipated rate of growth.

Although an estimate of the total potential enrollment of the district is of prime importance for long-range planning, it is also necessary to attempt to establish a time-line along which growth will occur. Techniques developed for the projection of school enrollments often assume that the future will be an orderly extension of the past. This assumption may not always be true, considering the number of variables which affect growth. But estimates made on this basis may easily be reviewed periodically to determine necessary changes in timing without any particular disturbance to the total master plan as originally conceived.

Methods of Projection

There are possibly a dozen methods for projecting future school enrollments. Each will generally produce a different set of projections from the same beginning figures. It is usually desirable to establish a mean projection based on figures derived from two or three different methods. The mean can be adjusted to allow for any known future circumstances which will have an abnormal effect on school enrollments. Three widely accepted methods for use in projecting are summarized below.

Method based on mean amount of yearly increase: A number of recent years, which

seem most representative of what will happen in the future, are used to establish a trend. This is done by determining the geometric mean of the year-by-year increases in total enrollment. The first year projected enrollment is then found by adding the mean increase to the current enrollment. The second year projected enrollment is found by adding the mean amount of increase to the first projected enrollment, and so on for as many years as it seems advisable to project.

In rapidly growing communities, this method usually produces a set of projections representative of the minimum enrollments which usually eventuate. This is because the projection is based on the premise that the amount of growth remains constant from year to year. In most dynamic communities, however, experience shows that growth gains momentum from year to year until nearing the point of initial population saturation.

Method based on mean rate of yearly increase: This method is similar in its approach to the first. It differs in that the projected figures are based on a percentage progression rather than a numerical progression. Therefore, year-by-year projections increase at a more rapid rate than by the first method, which is in keeping with the fact that growth usually gains momentum up to a certain point.

Projections are made on the basis of the trend as computed for a number of recent years. This trend is established by determining the mean percentage of total enrollment increase during these years for any given school level. This mean percentage is then applied to the current enrollment to determine the amount of increase, which, when added to the current enrollment, gives the first projected enrollment. The procedure is continued then for subsequent yearly projections.

Projections made by this method often seem less realistic in that a percentage progression produces a snow-balling effect and thus results in a set of projections which appear relatively high when compared with the figures found by the more conservative numerical progression method. The results are equally well founded on local experience and just as apt to follow actual developments.

Method based on survival from one grade to the next: This method of projection is usually more accurate on a short-term basis than either of the other methods since it is concerned with moving forward current grade-level enrollments rather than total school level enrollments. A trend by this method is established by using a number of recent years to determine a survival factor for each grade level. This is done for each year by dividing each grade level enrollment by the next lower grade level enrollment of the previous year. A mean factor of survival is then computed for each grade level and applied to current grade level enrollments for determining the first projection. Each subsequent projection is made the same way.

This method of projecting requires that estimates of future kindergarten enrollments be made with the greatest possible accuracy. Many smaller communities maintain a school census file which lists all pre-school children along with current enrollees and is kept up to date by an annual door-to-door canvass. This procedure is impractical, if not impossible, in larger districts and it is, therefore, necessary to relate kindergarten enrollments to the number of local births as reported by the health department. A trend is established by computing the ratio of each past kindergarten enrollment to the number of births over the previous five years. These ratios are then used to determine a mean ratio for use in making projections.

As stated previously, there are dozens of ways of projecting school enrollments. The methods outlined above are most applicable in situations where normal

growth has occurred and is expected to continue as a result of an increased birth rate and constant in-migration. In situations where an abnormal growth pattern is foreseen, as in the case of a newly planned military installation or large industry, any projections based on past trends would have to be adjusted according to anticipated housing projects and employment figures.

Recommended approaches made in this section of the study, as previously noted, are modified by the size of the school district and the facilities and procedures that may have been established to study growth and its implications.

The Principal's Role

Many school districts are of such a size that the principal remains the most important individual in interpreting the educational program to the architect and to the community—a role which he may play to a lesser degree in larger school systems. His opinions and experience, however, are invaluable and should be sought under all circumstances.

When the principal serves as the head administrative officer, or has a comparable responsibility, his is the task of defining the curriculum and its possible changes over the years ahead.

Some elementary schools include kindergarten through sixth grade. Others add the seventh and eighth grades. Different sets of problems occur and different interpretations must be made for changes within the specific structures. Some districts include more music, art, and special opportunity subjects than do others that may be contemplating extension of opportunities.

With such variables in mind, it is extremely important that the principal and the architect agree about planning and, as Caudill has so aptly said, "provide space for teaching."

In projecting plans, it is well to bring in such staff members as supervisors who may move from school to school and who are well acquainted with different classroom situations. Those who are in closest contact with the needs of both classroom teachers and pupils are normally best qualified to serve as consultants in a building program. They should be consulted as to the types of spaces needed not only for teaching but also for storage, corridor environment, and other facilities that contribute to the most functional program a district may offer within its financial structure.

The principal should, without question, make a thorough check with the classroom teachers, discussing the properties presently in use and hearing suggestions for improvement or expansion and reasons for such suggestions. Together with the principal, teachers are highly qualified to evaluate the program to be offered, outline the needs of children, and to document such information in a way that can be easily understood.

Planning for Special Services

Discussions centering on special services will be time consuming but essential. Perhaps speech therapy or individual testing is given at the local level. Remedial reading may be given consideration. In many sections of the country, cafeterias or lunch shelters are required. In this respect, one of the most difficult jobs confronting the administrator is how to utilize the space involved in lunch services to greatest all-round advantage. Multi-purpose rooms are often the best solution.

Some districts combine cafeteria and library; others, cafeteria and gymnasium; others, cafeteria and student activities center. It is suggested that in-wall tables and benches be provided for cafeteria use so that the floor space can be cleared

quickly for other uses. The use of clumsy tables and chairs imposes such a time handicap in clearance that other uses of space often become a "lost cause." Modern in-wall, roll-out benches and tables have proved so practical that they should be added to elementary school equipment at the earliest possible date.

Such needs and plans must be decided upon and documented so that space may be provided before any actual drawings are done by the architect. When, and *only* when they are documented, will the staff be ready to sit down with the architect for the final "go ahead" on preliminary drawings.

The Site

Special consideration must be given to the school site. The National Council of School House Construction provides the following advice: "There should be provided a minimum size of five acres plus an additional acre for each 100 pupils of the predicted maximum enrollment." Thus an elementary school of 200 pupils would have a site of seven acres.

Size alone does not insure success in planning a school. The general layout of the site and the placement of units in relation to one another are extremely important. Plot plans should consider play areas for the kindergarten, the primary and the intermediate grades. Whether buildings are to be single-story or multi-story is a key consideration. The continued success of a school that confronts a period of growth may well be determined by how carefully the plot plan is adapted to the site.

Preliminary Drawings

With the plot plan agreed upon, school planners are ready to consider preliminary drawings. Here the principal's work with his colleagues and with the architect takes on meaning as to how well the program has been interpreted. Unfortunately, not enough school leaders are able to "read" plans and are apt to mumble agreement as the dexterous finger of the architect flicks over the blueprint. To save embarrassment and to prevent costly mistakes, the principal should insist that the architect go over each area, each line, to be certain that the spaces for special use are adequately provided. It is also probable that a member of the general school staff, perhaps a shop teacher, should be called in as a helpful aide.

Since there can be no doubt about the need for curriculum changes in the years ahead, the architect should be asked to make buildings structurally flexible so that space changes can be made without extremely high remodeling costs. With modern building methods, this is not too difficult and it will give the principal and his staff a heightened opportunity to meet housing problems as they develop in the face of new pressures. No matter how carefully future enrollments are projected, most communities will have to adapt buildings to provide more space.

End of the Line

When preliminary drawings have been finished and accepted after careful study by all concerned, then working drawings can be ordered. This, in a sense, is the end of the line—too late for hind sight. Few buildings are perfect. As a school system grows, there is always something to be learned from what has gone before, and it may ever be thus. Nevertheless, error is minimized in accordance with the degree of care which has gone into the execution of any plan. Superintendent or principal, consultant, architect, teacher—each is a team member who can strike out or hit safely depending upon how he applies his judgment, skills, and his background of experience.

Irving L. Pike

Staff Participation

THE way in which a school staff participates in a school building program will differ from community to community —even from school to school within the same community. Community and staff attitudes and relationships in areas other than school planning will condition the latitude of decision making and the scope of preliminary planning.

This diversity among school staffs, communities, and educational programs does not permit the recommendation of one blueprint to certain success. We can come closest to a successful working pattern if we understand what has happened before, learn what the present needs are, possess professional acumen and personal maturity, and apply our efforts toward specific goals.

For Effective Participation

The manner in which principals and teachers work with other members of the community in planning a school building will vary considerably. Regardless of specific working patterns, these are some of the conditions which will contribute to

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effective participation in a school building program.

Acceptance of group problem-solving techniques: Staff participation will have greater chances of productiveness in those schools and communities with a tradition of problem-solving through the committee approach than in those where unilateral decisions are usually made by a single person or a group of appointed or elected authorities. It will be most successful in situations where techniques of committee work have been refined through practice; where committee members recognize their responsibility to the persons they represent; where experience has demonstrated that representative decisions earn broader approval and more general support.

As staff members plan for participation in school planning, they might consider some of the following questions. What is the status of the teaching profession in this community? What has been the tradition in our community for participation by school personnel on lay committees concerned with improving education? What has been the practice within our school for committee activities? Do we provide for small interest group work, for exchanging ideas freely and sharing practices? As a staff, how much alike are we in our point of view regarding the aims, objectives, and supporting philosophies of elementary education? How do we differ? Are we accustomed to resolving our differences, to developing group decisions?

Voluntary participation: Staff involvement in helping to plan for a new school building should be on a voluntary basis. This does not mean that all staff members will not need to participate in certain phases of the activity—for instance, detailing specific requirements for their grade level. But it does mean that participation on a committee, demanding substantial time and energy, should be a matter of individual, voluntary decision.

Preliminary self-evaluation: It is important for each staff member who will take part in the planning process to look objectively at the way he works with others. Actually, this is an excellent activity for an in-service program—whether or not it is in connection with a school building program.

Teachers and principals might ask themselves questions such as these. Can I organize my time so I can devote my energies to committee responsibilities? What special experience or skills or knowledge do I have to contribute? Will my membership on a committee represent the total school staff? What are my relationships with other staff members? Do I work easily with most of them? Do I approach them confidently? Am I approachable? Is the school climate one in which I can channel information to other staff members and represent them effectively? If not, am I willing to try to work around it or help bring about some change?

Purposeful participation: If involvement of the school staff is to be active, to be respected by others who are part of the planning process, then there is a purpose for staff participation. No purpose is served merely by having passive staff listeners at innumerable school building committee meetings. No purpose is served by representation on a committee unless the staff representative has an active function to help provide sound facilities for children. No purpose is served if staff members serve on committees simply for reasons of good community relations or to demonstrate the principle of representation in the democratic process.

If these are the only objectives, it would seem wiser for the teacher or principal to get a good night's rest, have time for preparing work plans, or enjoy some leisure-time activities. Staff involvement should have as its purpose the development of sound educational plants, geared

to the local community's educational practices and aspirations. Under such circumstances, teachers and principals will feel their efforts are worthwhile.

Recognition of staff contributions: Involvement of school personnel on community planning committees should bring some recognition to the contributions of the profession in planning a school building. This is in many ways dependent upon the status the representative has with the staff itself. He should feel that the staff has selected him as their representative in recognition of his experience, judgment, practicality, and articulateness in serving in the dual role of a member of a predominantly lay committee and a representative of the professional staff of the school system.

Clear delineation of responsibilities: More satisfaction will be realized by staff members if they are aware of some of the limitations to their participation before they begin to give thought, energy, and time to the project. Disappointments will be reduced if they recognize that theirs is primarily a role of advising, recommending, and interpreting educational needs in terms of plant and facility requirements.

Certainly, the staff should not feel that action taken by community planning committees is within the province of staff review. Staff members should not enter into working relationships of this nature if they believe that, *ipso facto*, they have become a kind of supreme court.

The staff must also be aware of the practical limitations of finance as they work. They cannot contribute sensibly to the planning project unless they think in terms of what is feasible for the community. The community's ability to support and build good schools is one thing to consider. To other groups will fall the primary responsibility for making the community aware of the need for more adequate financing. But teachers and principals, by virtue of their close contact with parents, can do much to build vigorous support for better schools.

If the community faces severe financial pressures, the staff will need to work particularly hard in pointing out the broad needs of the elementary school program and in justifying specific facilities. Even greater thought will need to be given to pointing out the importance of building for future needs. Every school—even the "temporary" one built to make do until more funds are available—is built for the future; all plants should be built for expansion. In communities where schools are built with only the immediate need in mind, the development and creative extension of curriculum are restrained and second-best. It is important to see that piecemeal expansion and adaptation of plant do not take the place of long-term evaluation and evolution of the instructional program.

Setting Up Staff Committees

Within the school staff, provisions will need to be made for communication among various special interest groups. Not all discussions should involve the total staff. Among the classroom teachers, there are the traditional interests of early primary, middle, and upper elementary grades. These differences are accentuated among staffs in 1-6, K-6, K-8 organizational plans and between those in self-contained and departmentalized classrooms.

All elementary school personnel should have opportunities to exchange information, channel recommendations, and interpret needs. Although arrangements will differ from community to community, people from the following groups should be taken into consideration: school medical, cafeteria, custodial, office, library, art, music, physical education, and special education. These people should join with the classroom teachers in some of their meet-

ings and have contact with members of the lay building committee. It is extremely important in setting up staff committees that provision be made to include special resource personnel who are members of the school system staff.

Less closely allied to the school program, but important to its purpose, are those parent and civic groups who also need avenues of communication because of their special knowledge or interest. Paramount among these are those groups concerned with safety. Driveways, bus lanes, street crossings, parking areas, cafeteria and fuel deliveries, and garbage collection need to be planned with safety factors in mind. Many lay members of the community can be helpful in doing this.

It may be expedient for these various interest groups to form a council to facilitate study and frame recommendations for review by the total staff or by a community building committee.

Securing Information

To help prepare staff members to participate in a building program, opportunities should be provided for study and obtaining information. Arrangements should be made for visiting other new schools. Because of their background of experience in working and living with children in an existing school plant, teachers can learn things from such visits that cannot begin to be duplicated by the most conscientious lay committee member. Sometimes, the result is money saved. More often, the savings cannot be measured in terms of dollars, but nevertheless are present in terms of greater utility, adaptability, and durability of facilities.

Information can also be obtained from the literature of professional associations and from publishers of books on school construction. The same is true of the commercial materials provided by equipment manufacturers and suppliers.

Some Cautions

Caution should be observed concerning the demands made on the staff's time and energy. Their major responsibility continues to reside in their classrooms and with the children they are teaching. Commitments to work with a building project cannot take priority above this obligation.

Equally important, organizational mechanics cannot be permitted to become an end rather than a means to an end. Committees and sub-groups should serve a purpose rather than become a purpose themselves.

Care should be taken, too, to differentiate the kind of contributions staff members can make. Some will work throughout the total planning period; others will participate on a short-term basis for the study of a specific problem. Not all staff members can make equal contributions. Quite understandably, those teachers who may be assigned to the new building will have greater incentive and more interest in participating.

Summing Up

Teachers, principals, and other members of the elementary school staff can contribute much to a building program. But if they are to make a maximum contribution, it is essential that considerable preliminary planning be done and that each member of the staff evaluate the contributions he can make.

Throughout their participation in school planning, staff members will need to return again and again to two fundamental premises. First, the proposed building is to facilitate and enhance the curriculum, not to crystallize it or restrict its responsiveness to future needs. Second, the building is to provide a learning and living environment for children and should be conceived in terms supported by research in learning and child development.

Milton H. Steinhauer

Planning in Terms of the Community

SCHOOL building programs should begin with an analysis of community conditions, potential population growth, and the educational values held by the people of the community. Today we are living in a time when mobility of population and a high birth rate are causing tremendous growth in most communities. It is, however, important to realize that growth, as related to school housing needs, should be considered not only in terms of the number of children and youth to be housed but also in terms of the breadth and scope of the educational program.

Need for Common Goals

Growth in population, fear of totalitarian states, and lack of faith in our own economy and educational program create differences of opinion in a community about educational values, procedures, and the content of courses of study. Adoption of a long-range building program requires some resolution of these varying opinions.

Basic to this resolution is an understanding and community-wide acceptance of the purposes of public education. If the educational goals of the community are steeped in a little-red-schoolhouse tradition, truly *functional* buildings are not likely to result. On the other hand, if most citizens accept as the goal of education the development of citizens prepared for successful living in a highly industrialized, technological, democratic society, then buildings adjusted to modern educational needs are more likely to be constructed. The functionally designed school plant, by being part of the educational process, contributes to pupil development.

A school building has physical functions to serve. It provides shelter and facilities in which pupils, working with other children and teachers, learn certain subject matter and develop fundamental skills. But it does more than this. It also serves the emotional needs of children. It provides a setting which either impedes or makes more effective the work going on in and around it. There is a definite relationship between the school building and the success or failure of the learning experiences which take place in it. There is a significant difference between the "art of school building" and architecture. Architecture is not an end in itself. It is a means, a tool for making the schoolhouse express the community's concept of the learning process.

A modern school structure is designed to implement the activities for which education exists. School buildings no longer merely house a number of children; they contribute to the educational program.

The design, size, and number of school

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buildings, therefore, are of primary concern to all the people in a community. Whether school buildings are built primarily to house children or to implement an educational program—present and future—depends a great deal upon the leadership exercised by educators. They present the facts and then the people—usually through their elected representatives—decide the type, size, location, and function of their school buildings.

In making their decisions, the people must consider a number of controversial questions. One such is, "What kind and amount of education shall we provide for the children of this community?" The answer should be based on a number of factors, the most important being the relations between children and the home, school, neighborhood, and community.

Child development takes place in gradual stages in preparation for successively complex environments—the home, the neighborhood, and the larger community. Studies in child growth and development suggest that the size and the location of elementary school buildings should be based on such factors as home-school proximity. The neighborhood-school concept is predicated on the desirability of retaining the warmth of the home, and of fostering physical and mental health by moving gradually to larger and larger environments. If these theories are accepted, then the community will build small neighborhood schools to house children in the early elementary grades.

Planning for the Future

School planning must also be influenced by the population patterns of the community. This requires a continuous census of children in the community, plus a knowledge of the amount and direction of growth. Consideration must also be given to the availability of land.

In addition, school buildings must be designed for the future as well as the present. Educational changes are continually taking place. While the community must think about immediate educational needs, it must also consider the rapid changes that the next decade or two will force upon us. School plants which may seem adequate now may not provide for the kind of educational program which will need to be housed when children face a different kind of world ten or twenty years from now. The impact on school plants of technological and sociological advances should be carefully studied. School buildings must be flexible and allow for inner changes in design and for easy expansion. Citizens must be helped to consider future as well as present community needs.

Traditionally, public education in America is a local institution. To a large extent, the citizens of the local community determine the nature and quality of education. Through pressure groups, through the ballot, or by power exerted by opinion leaders, the citizens decide the curriculum and the kind and design of buildings which will house this program. Obviously, then, it is necessary for educators to understand the needs and desires of the people. In most communities, people will differ as to the purposes of education and how these purposes can be accomplished.

Lay participation in the building program appears to be one way in which the community can study, work together in gathering information, and reach agreements on the program and plans for school construction and placement. These are not questions of fact, but of viewpoint. They cannot be settled mechanically. Many decisions must be made in terms of values. What is important for our children? What can we afford? Such questions must be resolved before a successful school building program can be begun. It is a challenge to the educational leadership of the community to see that this is done.

LAYMEN have a part in SCHOOL PLANNING

Gerald E. Clarke

EVEN in the most mundane and limited sense, a public school cannot be built without the active support of the community which it will serve. In more fortunate districts, school boards and administrators with building problems will seek and accept community advice in school plant planning as a natural phase of a continuous program of school-community relationships. Better than the grudging tolerance expressed in the dictum, "If you can't beat 'em, join 'em," is the wholehearted conviction that lay groups belong at the conference table, along with educators, architects, and school board members, in certain phases of planning for a school building program within the community.

Three parties have advice to contribute to a school board faced with the need for providing additional room for learning. Teachers and school administrators have a specialized knowledge of children and the curriculum and valuable experience in the relationship between these and physical facilities. The architects are the translators of function into practical design, the experts who know economy, quality, and standards. But we cannot stop here in planning a school. We must involve in our planning sessions the parents and neighbors of the children who will benefit from attending the school we build.

Gerald E. Clarke is Principal of the Cayuga Heights School, Ithaca, New York.

Why Involve the Public?

There are several cogent arguments for involving the public, both practical and idealistic. For one thing, voters are less likely to see "frills" in plans and specifications which have been drawn up in close cooperation with citizens groups. There is, of course, no sure-fire plan for securing public approval of bond issues. When these bond issues do fail, however, some breakdown in communication is often involved. Frequently, the public has not been convinced of the need for a new building or has some quarrel with particular features proposed. In the experience of many communities, broadly representative lay groups can help to inspire public confidence and gauge the public pulse.

In another sense, educators alone should not undertake to determine whether or not to include a swimming pool or an industrial arts shop in a new school building. The curricular issues which underlie such architectural features can best be resolved in joint lay-professional discussion groups where there are opportunities for thorough discussion. A school plant is more than an educational warehouse; its every detail should implement a community's plan for its children's education.

Parent Groups

There are several possible channels available to administrators and school board members who recognize the need for working cooperatively with the community on building plans. In most districts, there are parent-teacher organizations. The administrator will maintain communications with the local parents group as a matter both of policy and courtesy.

This kind of organization, however, cannot serve as the sole structure for working with the community in estimating and planning needed buildings. To a certain extent, any parents association is stigmatized as a "special interest" group in the wider community which must accept a building proposal. Most such groups adhere to a policy of neutralism in the political issues which so often attach themselves to the implementation of a building program. Finally, parent-teacher groups are not broadly representative enough to serve as the only advisory group in school building planning.

School boards which place reliance on such existing groups as their sole medium for community participation in surveying school needs and formulating plans will find that they have excluded much talented counsel and gained relatively limited support for the plans to be proposed.

Citizens Committees

There is room in most communities for both parent-teacher associations and lay school advisory boards. Both are needed. Both have a distinct role to play. They should communicate and cooperate with each other and with the school board and administration but should maintain their identities.

How can a school system organize an effective citizens committee? In Ithaca, as in many communities, the citizens group was created all but spontaneously by the very crisis which it served to resolve. A needed bond issue was under heavy attack by a very vocal minority and men and women of good will banded together as "Citizens for Good Education" to support the building program of the board of education. The best interests of the children of the district won handily in the ensuing referendum and the citizens group organized for a continuing study of the community's educational needs.

In other towns, lay groups have a less spectacular origin in some founder's appreciation of the resources to be found among the people of every community.

The leadership varies. In some areas, school boards and officers recognize the potential values to be gained and call for the organization of advisory groups; elsewhere, the impetus comes from laymen.

Defining Relationships

The central problem in communities where citizens committees are active in behalf of the public schools is the definition of relationships among the school board, the administration, and the citizens committee.

The lay advisory group is not the creature of the board of education, even when the initiative for its organization comes from a board invitation. There should be a genuine commitment to the values of lay participation in school planning on the part of the board of education and not just lip service to the idea. On the other hand, laymen must very clearly understand from the beginning that their function is to study, interpret, and recommend, but that policy decisions rest with the board of education.

A mutual restraint must be cultivated in this area. A careful definition of relationships in the early stages of organization of a local advisory group will prevent many headaches in later operations.

Who Should Serve?

The problem of representation is a knotty one. Only the rare community can have a direct "town meeting" type of lay participation. Certainly, to be effective, any committee which is formed must be broadly representative of the entire community. Ideally, it will be composed of individuals from all neighborhoods and localities who have broad community interests. No weighted or "slanted" special interest group will gain much public support. Advisory committees have no foundation in public law. Their success depends very largely on their earning the confidence of the community through tangible achievement and services.

A closely related problem is that of perpetuation of advisory committees. It is easy enough, of course, to organize a short-term group of lay volunteers to help out through the heat of a bond election campaign. But there may need to be provisions for longer term participation if laymen are to be involved in the larger issues of providing school facilities for our children. Population dynamics being what they are, few communities permanently solve their building problems. To anticipate growth and plan to have buildings ready when they are needed, to study educational goals and relate these to plant design, to reassess constantly a community's ability to finance its plan for the education of its children—these are long-range tasks and many communities may find it helpful to have a citizens advisory group at times other than during a bond issue.

The membership of such committees, however, cannot be static. The most willing and able of volunteers find themselves pressed with conflicting responsibilities. A not too surprising number of them, having proved their talents and interest in public education through work on advisory committees, become "naturals" for election to school boards. A well-advised citizens group will anticipate these losses and provide for the regular recruitment of fresh resources.

Outside Consultants

In New York, and in most of the other states, communities seeking to marshal effective advisory groups have recourse to a group such as the State Citizens Committee for the Public Schools. This is an independent, non-profit, educational organization. It has no local affiliates but in

the six years since its inception, it has helped many citizens groups resolve local school problems. The state group maintains a small staff to advise local committees but it does not supervise them. It has set up a statewide information exchange system and acts as a clearinghouse for information on the successes and failures of local advisory groups—thereby helping other communities throughout the state.

Groups such as this encourage all community interests to participate in a continuing study of local school needs. They help communities identify potential lay leaders and furnish them with counsel and case experience from other localities. In a time of near-panic over the alleged shortcomings of American public schools, groups like the New York State Citizens Committee have quietly demonstrated the basic truth that our schools are just as good as the local communities want them to be.

Values of Lay Participation

Unquestionably, there are problems ahead for the administrator and school board who commit themselves to working cooperatively with lay groups in providing for new school buildings. Inevitably, misunderstandings arise and delays occur. The temptation is ever present to short-circuit the cumbersome processes of consultation, to draw up a quick, efficient, unilateral proposal and hope the public will accept it.

But in community after community, educators who not only have accepted lay help in school planning but also have sought it have become partisans of citizen participation. It is not always possible to visualize all the benefits which may arise. One example from recent experience in New York State may be cited.

A town within commuting distance of New York City found itself changed by postwar industrial development from a static, semi-rural community, to a suburb burgeoning with new residents with young children. The existing schools were soon overcrowded, to the extent of double and triple sessions. Naturally enough in this setting, tensions mounted, factions formed, and wrangling over school issues became general. There were headlines and letters to the editor and even anonymous threatening telephone calls at nighttime.

At the request of school and civic leaders, the State Citizens Committee sent a skilled consultant to work with local leaders in analyzing the situation and resolving the conflicts. A local citizens group was formed to study school needs. Honest efforts were made to advise the public of facts and the community's attention was centered on its educational goals and needs, without regard to personalities. As a result, tempers have cooled and the people generally seem favorably impressed by the fact-finding approach to school-community problems. Citizens groups are continuing studies to help the board of education avoid future crises.

Not every community, fortunately, has school problems as grievous as this one. It has been sketched to establish two points. First, enlisting the aid of laymen in the community can remove some seemingly impossible roadblocks of public apathy and hostility stalling progress on needed building programs. Second, working with the community on school building needs involves much more than the offer of a cursory public preview of the architect's plans, or the organization of a door-to-door campaign the week before the bond issue referendum. Every community has within itself lay resources which deserve continuously to be utilized, channeled, and appreciated. The children and the entire community will benefit from this recognition.

TAYLORVILLE Builds a School

Mary Spiller

IN a small community, the construction of a new school building is probably the most important event in local history. It is a project in which virtually everyone will be interested and in which, because of the size of the community, nearly everyone can participate.

In such an undertaking, cooperative planning is fundamental to success. Parents, teachers, school board members, children, and the architect all play important parts. Each must understand his role.

We recently completed a building program in Taylorville in which the community was closely involved. We feel that much of the credit for its success was due to the fact that the patrons had a part in the planning and were kept informed at all stages of progress. While the architect, school board, and educational staff made decisions in their own areas of responsibility, members of the community actively contributed to the project.

Our building was constructed as part of a county-wide program which began in 1955 when the Tuscaloosa County Board of Education arranged for a survey of building needs in the county. This survey was made by a team of experts from The University of Alabama Research Department. Results were printed in pamphlet form and widely distributed throughout the county. Pictures and articles describing needs were published in the local papers and PTA groups all over the county studied the recommendations. Two important questions asked were, "How will this new program affect each individual community?" and, "How will the program be financed?"

A new building was recommended for the Taylorville community. A one-cent sales tax, which was passed with very little opposition, took care of the financing of the program.

Preliminary Planning

According to the plans announced, the school at Taylorville would be the third one constructed. This meant a waiting period of at least two years.

Our faculty and PTA decided to use this time as a preparatory planning period. We wanted to begin our thinking and planning early enough to be sure that we would get the kind of building that would most nearly meet our needs.

Our first step was to decide upon the kind of program we wanted in our school. We began by considering what constitutes a good program in an elementary school. Parents were invited in, singly and in groups, to observe in our classrooms and to talk with the teachers about what they were trying to do and about what they could do if they had more adequate facilities.

Mary Spiller is Principal of Taylorville Elementary School, Tuscaloosa, Alabama.

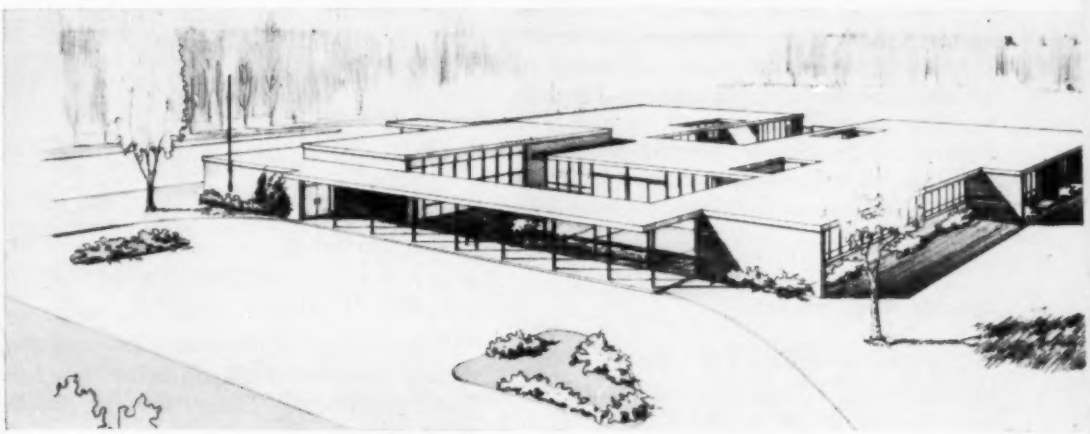
The parents saw the crowded classrooms and small lunchroom and marveled at the fact that we were serving three hundred pupils daily in this small space.

After observations in our own school, the parents visited other schools, including the University Training School, where they saw an enriched activity program. They discussed the possibilities of a similar program in our school.

The supervisors met with the PTA group several times and discussed school programs. They answered many questions, for these parents had really become interested in providing the best program possible for their children. They wanted to learn about the kind of building needed for an enriched activity type of curriculum.

The second step was to study trends in modern school construction. We invited the principal of one of the recently constructed buildings to talk to us about the special features of his building. He explained construction details, materials used, and pointed out good and bad features. He gave us valuable advice on errors to avoid and things to include in our plans. He also invited us to visit his building.

We next asked a lighting expert to discuss lighting in our new building. He made a most informative talk and showed helpful films. He also made recommendations for improving the lighting in the existing classrooms which we carried out since we were going to use the present building until the new one was completed.



Englewood School, Taylorville, Alabama
William I. Rosamond & Associates, Architects, Columbus, Mississippi

This lighting expert was a member of the local Junior Chamber of Commerce. He interested the members of this organization in the Taylorville School with the result that one afternoon they came armed with paint and brushes and gave the interior of the building a new coat of paint. They used the Harmon technique to work out color schemes, being guided in their choice of colors by the exposures of the rooms. They wanted to demonstrate what the proper use of color can do for a classroom. This was a most enjoyable affair because the young men were so enthusiastic and interested in the project. The PTA cooperated by serving a hot supper and by cleaning up after the men had finished painting.

Sometime later, a visitation program was started. Two beautiful buildings had now been erected in the county and we went to see them. These visits were made at night so the fathers could go, too. Many parents participated and showed an amazing interest in such details as heating, plumbing, wiring, and classroom arrangement. They especially liked the radiant type of heating. The mothers couldn't see enough of the modern kitchens, with their stainless steel, their huge walk-in refrigerators, dishwashers, and potato peelers.

We feel that these visits did more to arouse interest and enthusiasm for our building program than anything else that was done. It seemed to bring home the fact that we were really to have a building similar to these, and the people were delighted.

Specific Requirements

The time drew near for a meeting with the architect. It was imperative that we make a list of the things we wanted in the building. We chose a committee from the PTA to meet with the faculty, the superintendent, and the supervisors to draw up this list. We had some spirited discussions and everyone had an opportunity to share ideas. But we finally came up with a list of "musts" for our community. Some of these things were:

- An auditorium accessible from the outside which could be closed off from the other parts of the building
- A multiple-use room for community as well as school use. This room would accommodate club meetings, scouts, recreation, rhythms, dances, and dramatics. It would have a low stage at one end and shelves for books at the other, and a tiny built-in kitchen. This room would be readily accessible from the outside and easily closed off from the remainder of the building when necessary.
- A covered drive-in for buses so they could load and unload without students being exposed to inclement weather
- A large paved area for skating and dancing
- An entrance and drive for mothers to pick up and drop off children without getting in the way of buses
- A health clinic with hospital rooms for both boys and girls
- An office wing with the teachers' lounge, workroom, and adequate storage space
- Enough classrooms to take care of needs at present and in the foreseeable future
- A lunchroom and cafeteria combination with an adequate seating capacity and stage

These were the essentials—classroom details were to be left up to the teachers and supervisors. The lunchroom details were worked out by the lunchroom supervisor, principal, and architect.

The sketches submitted by the architect included all of the things we had asked for and were soon completed to everyone's satisfaction.

Selection of Site

While we had been engaged with our plans, the board members had not been idle. They had toured the countryside in and around the community looking for the very best possible location for our school. Here arose the first difficulty. The people did not want the school moved. The board had warned the community a year earlier that the new school would require a new site, but somehow the warning was not heeded. The people could not or would not believe that the old site would not be used. But there were several reasons for a

change. The present site was not large enough and was too near the limits of a nearby city. The board felt that the new building would soon become annexed by the city.

Another plan had also arisen which made a change in location imperative. A small school seven miles below Taylorville had steadily grown smaller, so after due deliberation, the county board decided to consolidate it with the new school at Taylorville. The people of this smaller community were willing to give up their school, but they made two requests: that the school be moved nearer to them, and that a new name be selected. Our board granted these requests and purchased a site two miles nearer to this community. When the selection was announced, there was some disappointment in the Taylorville community. But when the board explained its reasons and when an election that was held about this time brought the larger city almost within sight of the school, the opposition quickly died down.

The question of a new name for the school was settled amicably enough. Committees were appointed by both PTA's to handle this matter. These committees asked students and parents to suggest names and then they selected the most popular ones. It was found that both communities favored the same name, "Englewood," so that was the one chosen.

During Construction

When the plans were completed and approved, the contract was let and construction was begun. While construction progressed, we were not idle. Knowing that a new building calls for new equipment and many things that the sales tax funds would not provide, the parents worked to raise funds so that we could have the things we needed when we occupied the new building.

During the construction period, we worked on choosing colors, selecting furnishings for the offices, the teachers' lounge, the stage, the health clinic, and multiple-use room. Interest and enthusiasm remained high and everyone cooperated beautifully—even those who were disappointed over the new site.

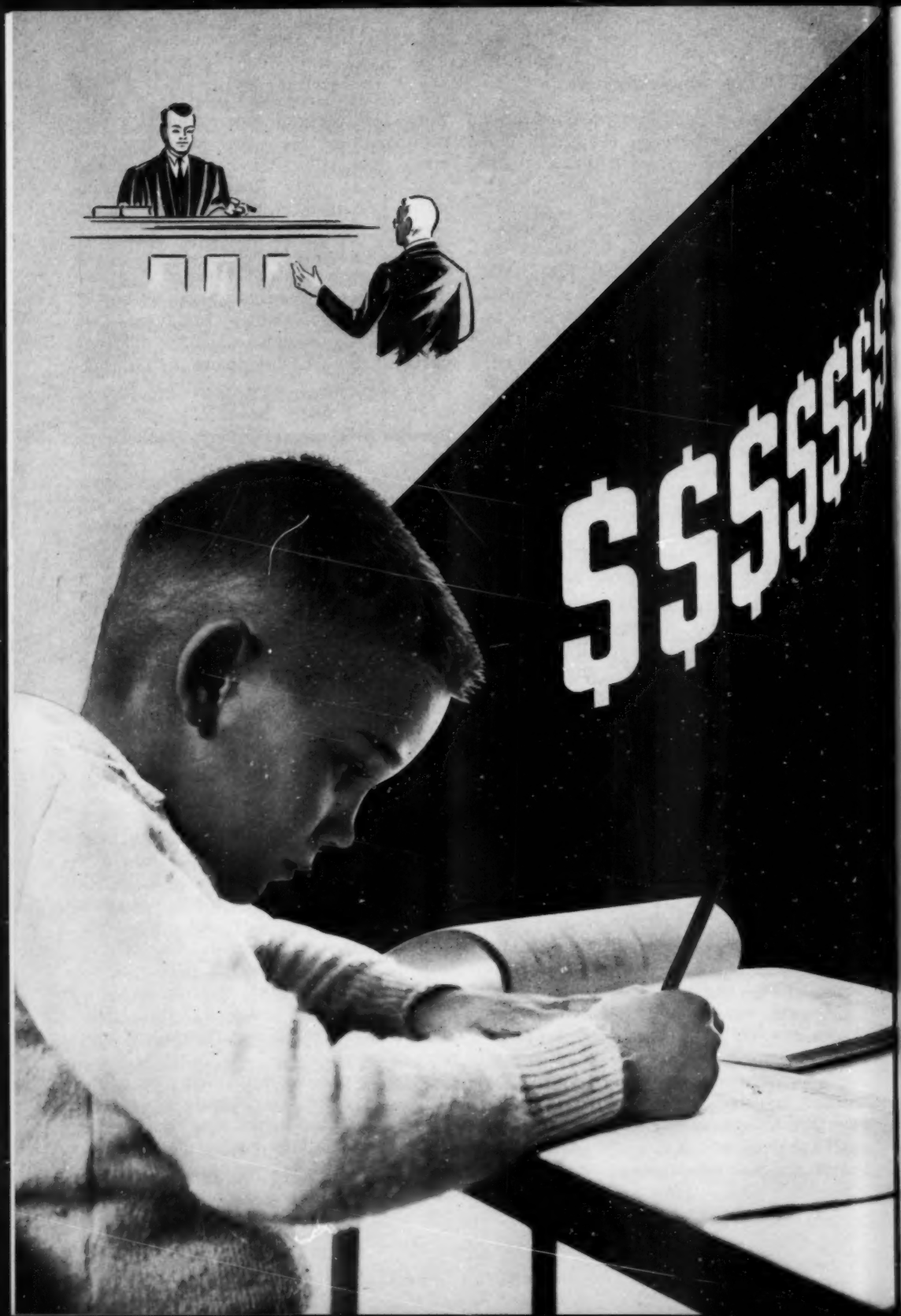
People were kept informed of construction progress by means of a chart posted in the foyer of the old building. This chart showed the dates when the different parts of the building were to be completed.

Benefits of Community Participation

We feel that this experience was a valuable one in many ways. First of all, it brought the people into the school. They felt that we were doing a good job in spite of our handicaps, but that we could do much better with proper facilities. They saw many ways in which they could be of assistance to us, with the result that we now have an active scout troop, a speech therapy class paid for by the local Elk's Club, and an interested group of mothers who are ready to help us with field trips, underprivileged children, costumes for plays, playground programs, and many other activities.

Our parents found that the money they are spending for education is returning dividends in many ways. They also discovered that while the school buildings which are being constructed are modern and comfortable, they are not the palaces that some writers would have us believe them to be. By observing in the classrooms, they learned that children do know how to read and, better still, that they know how to think for themselves and solve problems.

Bringing parents into classrooms is the best way to enlist their active support and cooperation. It demonstrates that teachers and parents have one common interest —the welfare of children.



DOLLARS AND LAWS

No school can be built without money. And no school can be planned and constructed without reference to laws. These are the shoals on which many a dream for a new school has foundered. To turn dollars and laws into implementers, rather than obstacles, is an essential step in building a new school.

John W. Polley

Financing the Building Program

NO educator can afford to be ignorant of school finance. Finance has a tremendous effect in extending or limiting the development of effective educational programs. The elementary school principal needs more than *minimum* knowledge because he holds a responsible position and because he is constantly thrown into situations where his opinions are taken as expert. In no portion of the field of finance is this more true than that of the financing of school buildings. Especially is this true if the building is a new one or one which is about to be constructed. But it is also true even if the building has been erected for many years.

The principal is, of course, a member of the administrative team and no one expects him to have all the answers. Many answers will come from the assistant superintendent, the business manager, or the superintendent of schools. But the principal does need to understand basic principles and facts: where the money comes from and how it is spent, both in general throughout the school system and especially in his own building. He needs to know the property tax rate for the support of schools in his community, how it is levied, collected, and how divided among governmental units. If there are other sources of local tax revenue, such as a sales tax or a wage tax, he should understand how these work. He should know what proportion of funds goes to building costs and what part is used for current expenses.

Such information is basic. More directly applicable to the building program is information about the total cost of the building, the impact of school costs on the local tax rate, how much of the school revenues are raised locally and how much comes from the state or, in a few instances, from federal sources. There are also specific breakdowns of information in each of these areas which give meaning to the over-all figures, and there are the usual comparative figures such as costs per square foot (which may be unreliable without many qualifications but nonetheless must be available).

School Buildings Reflect Program

The day is long since past when a competent teacher on one end of the log and

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an apt pupil on the other end constituted the ideal educational program. Too much is known of the use of materials of instruction and of methods of teaching to think that teaching is so simple. But if these materials and methods are to be used to maximum advantage, provision must be made for them in the school building.

Much has been said about fitting the school building to the philosophy of the educational program. A very simple building, indeed, would be necessary if the community's and faculty's concept of education were limited to teaching children to read and write through textbooks. If, on the other hand, the philosophy of the school and community is to provide the best possible education for each child, no matter what his potential, then the building and its equipment must be complex. Both current expense and building construction costs will be higher than under mass instructional textbook methods.

We have posed here two extremes in the development of education in the United States. Most school systems are at neither one extreme nor the other but someplace along the road between mass instruction and individual instruction. In any society which places primary emphasis on the importance of the individual, we can hardly do less than provide for the maximum development of each child in our schools. The question is not, "Can we afford it?" but, "Can we afford not to do it?" In an economy of abundance, such as we have in the United States, the cost of education is but a trifling part of our total income.

Sources of Revenue

One doesn't have to be a tax expert to understand where the sources of school revenue arise. In our governmental system, there are three major taxing levels: the federal government, the state government, and the local government. Depending on the part of the country in which you are located, greater or lesser emphasis is placed on each of these sources.

Federal Funds

Most federal school funds today are expended for specific purposes such as for homemaking, or for trade and industry, or for agriculture, or for the newly-instituted programs in guidance and in science teaching. These programs are aimed primarily at the secondary school level and do not affect directly the elementary school. There is one major exception, however. This is the school lunch program, which is the largest of the federal programs of aid to education. The school lunch program has had rather strong effect on the financing of school buildings since it has been responsible in considerable measure for adding the cafeterias which we now find in many elementary schools and in practically all high schools.

Except for federally-impacted areas, the proportion of funds received from federal sources, however, is not great. For the nation as a whole, about three percent of current revenues of school systems come from this source. In federally-impacted areas, the proportion depends on the strength of the impact. In such areas, school funds are available not only for school programs but also for construction of needed school buildings. There are relatively few communities where much of the new school building program has been carried on through funds obtained from the federal government.

The distribution of federal funds for school buildings depends primarily on the need for housing and on how much of the increase in pupil population has been caused by families of persons employed on

federal projects. Funds are distributed on a per eligible pupil basis.

State Funds

State funds provide a considerably greater portion of the monies used to finance school programs and school building construction in most states. State aid for the educational programs ranges in amount from practically one hundred percent in states such as North Carolina, down to the five or six percent provided in states such as Nebraska.

State aid in total amount and in proportion has been growing both for purposes of supporting programs and for the construction of buildings. This is the logical result of changes in the tax base. At one time, when the economy was largely agrarian, almost all state and local taxes came from the property tax. Gradually, as our nation has changed to an economy of money and know-how as well as agriculture, the sources of tax revenues have also changed. By and large, local public school revenues continue to come from property taxes. Most state governments have moved toward taxes based on two or three different sources, such as income taxes (both personal and corporate), sales taxes of many different varieties, and various miscellaneous taxes which fit unique economic conditions in the state. Examples of these are the stock transfer tax in New York State, taxes on horse-racing in populous states, and the severance taxes which are lucrative in states such as Texas and Louisiana.

Because the need for school buildings varies widely from year to year in a given school district and varies so greatly among local units, the provisions for financing capital outlay must be different from the provisions for financing current school costs. In extremely small school systems, it is necessary to build only once every fifty years. Extremely large school systems have annual construction budgets which can be put on a recurring basis. Other school systems fall some place in between, depending on their location and on the birth rate, the locations of previous buildings, and the number of children entering school.

Currently, most states use a system for financing capital outlay based on some form of ability to pay. The ability-to-pay plan means that the state supplies its funds in inverse proportion to the wealth of each district. Wealth is usually measured by property values or, in a few states, by an index of wealth to property values. There are, however, occasional states which employ matching formulae for capital grants. In addition, Pennsylvania and several other states have set up school building "authorities" or agencies which are given special power to borrow for school construction. The cost is paid off by the district over a period of years on a pay-as-you-go basis. State aid to the district on this program is then prorated according to ability to pay.

A number of states supply building funds on the basis of a certain sum per classroom unit (which is simply the number of pupils in the classroom counted together). The local district is required to provide an amount determined by a local tax levy. The difficulty with such arrangements in most states is that the allowance per unit is usually too low. As a result, the total cost that the local district must assume is considerably more than can be produced by the local tax levy. Only a more realistic state allowance can meet the needs in these situations.

The typical elementary school principal does not need to know the details of the many state plans, although he should know the formula in his own state. His responsibility is to know how much of the cost of a new building must be paid by the local district and how much by the state, and the effect on local taxes. To

learn this the elementary school principal must have some computing ability and know something about the state formula which applies to his particular state. Any administrator can learn the little that is contained in the above requirement in a brief time.

Local Funds

Local school support usually comes from property taxation. There has been some trend, especially in the larger cities, toward non-property taxes, such as local taxes on incomes, sales, admissions, and business transactions. Although most of these taxes are used by municipal government rather than by school districts, they do broaden the local tax base and make available more funds for all types of local government.

There is a great need for tax sensitivity on the part of school administrators. As we build more and more school buildings and educate increasing numbers of children, school administrators must be aware that there are these new sources of revenue and that the schools must receive their just share from these sources. Often schools will not share in new tax programs unless school needs are vigorously presented.

The construction of each new school building adds a definite amount to the expenditures of a school district over a given period of time. Normally, such expenditures are amortized over a period of 20 to 30 years. Occasionally, the period is less. For example, if the school district has an assessed valuation of ten million dollars, which is, by the way, the assessed valuation of a comparatively small district, one mill or ten cents a hundred or one dollar a thousand will raise $10,000 per year. If the cost of the building is amortized at the rate of $20,000 annually, then this requires two mills on the local tax rate.

Local tax rates vary greatly depending on the level of assessment as well as on the amount of funds raised. In a group of some 150 school systems across the United States, a recent study showed tax rates ranging from a low of $1.00 a thousand to a high of $97.50 a thousand. These tax rates are not directly comparable because they are based on *assessed valuation*. For example, when the tax rates for these communities were recalculated on *true value*, they actually ranged from $.80 to $34.40 a thousand. This is a considerably smaller range and verifies what is well known, that *assessed value* is often only a small fraction of the *true value* of property in a given school district.[1] When the school principal compares the burden of taxes added by his new building with the burdens borne by similar communities, he should make this comparison in terms of *true value* rather than in terms of *assessed value*.

In the example above, if the assessed valuation of the district is ten million dollars and the ratio of assessed to true value is 50 percent, then the full valuation is twenty million dollars. If true value were used, the tax rate required to support the amortization of the buildings would be one mill rather than two mills.

To convert assessed valuation to true or full valuation simply divide the assessed valuation by the ratio of assessed to true value. This ratio can often be obtained from the local superintendent's office. About half the states compute the ratio for every locality in the state. Others leave it to local government and, in some states, the ratio is not computed at all. To compute the tax rate, divide the total amount of the tax to be levied by the total valuation of the district. The resulting figure will be the rate in mills.

Every principal in a school system should be able to compute what an increase of a given amount of expenditure will do to the tax rate. Since finance is

the life blood of a school program, there can be no excuse for being ignorant of this simple fact.

Methods of Financing Capital Outlay

School construction is financed in several ways. It may be paid for out of current revenues. Only a few big cities could follow a pay-as-you-go plan and normally even they do not do it.

A second way is by the accumulation of a reserve building fund. The reserve fund method is generally too slow and too late, especially in recent years with rapidly increasing enrollments. By the time the need is sufficiently well known to justify the accumulation of a reserve fund, the necessity for a building is so pressing that it must be constructed immediately. Therefore, reserve funds must be supplemented by bonds or borrowing.

The third way of paying for school construction is by short-term borrowing.

The fourth way is by long-term borrowing. Borrowing and paying off over a period of years (labeled *debt service* in the budget) is the most commonly used method.

A fifth way of paying for school buildings is the "lease back" method. Pennsylvania, Kentucky, and Indiana are among the states that have established building authorities by state law. In Pennsylvania, the authority is organized by the school district itself. In Kentucky and Indiana, groups of local citizens form corporations to build the schools. In all cases, the buildings are paid for by the rental revenue obtained from the district and paid to the group responsible for the buildings.

Each of these plans has its advantages and disadvantages. The pay-as-you-go and the reserve fund plans are the cheapest because they call for no interest payments. Interest, of course, is a considerable portion of the cost of a building when the payments are stretched over a twenty-year period. But, for many reasons, the "cheaper" methods cannot be used.

The third way, short-term borrowing, can sometimes be more expensive than borrowing long term. One must be an expert in short-term borrowing to get the most favorable rates of interest. The "lease back" plan often is the most expensive because when the full credit for the district is not behind the loan, the interest rate is apt to be higher.

Increases in School Costs

In the past, expenditures for school construction have been a comparatively small part of total school expenditures. The general public can see each school building every day when they often cannot see the supplies and materials for which expenditures normally equal the cost of school buildings. Perhaps this is why charges of extravagance are so often aimed at building programs.

Despite these critics, the facts are that school building costs in recent years have increased less than the cost of other types of construction. According to U. S. Office of Education data, the average cost of school construction has doubled over recent years while, over the same period, the cost of other types of construction has almost tripled.

One reason for the increase in school construction cost has been the enlargement of the schools' purposes and programs. Where formerly only classrooms were built, now there may be a health room, a guidance room, a cafeteria, a gymnasium, and often an auditorium. Many of these additions serve not only the school program but also the community's recreational and cultural needs. To cut costs and to offset the expense of adding new services school boards, superintendents, and architects have eliminated cupolas, columns, massive entrance foyers,

marble work, and the like. These economies are seldom noted by the critics nor do they recognize that a "cheap" building may be costly to maintain. Linoleum is cheaper than terrazzo but linoleum wears out and must be replaced. Cinder blocks in the corridors are less expensive than tile but tile does not need innumerable coats of paint and scores of dustings.

Factors Affecting Cost

To achieve real economy in school construction a balance must be struck in the complex relationship between original cost, educational utility, efficiency, maintenance, and operational expense. It would be possible to construct a building so cheaply that in the long run both the extra expense of its operation and the losses in educational efficiency would be far more costly than the original outlay.

The arrangement of space also affects the cost. In some climates, corridors can be eliminated almost entirely or at least placed outside the building. In other climates, this is impossible. Usually, a lobby is essential to any public building and necessary for the orderly movement of traffic. The elimination of less essential facilities is wise if it preserves the necessary instructional facilities. But cutting costs recklessly may merely cause new difficulties and ultimately result in larger costs.

The type of construction affects cost but may not affect the educational return. Will the building be fire resistant or combustible? The loss of life in the 1958 Chicago school fire is ample proof that no one should ever settle for less than a full measure of safety. Providing for safety adds to school construction costs. It may add very little to the educational program but it does mean that teachers, parents, and all thinking citizens can sleep at night and proceed during waking hours with clear consciences.

The mechanical equipment of a building may add as much as one-fourth to the total cost of construction. The adequacy of this type of equipment is reflected in children's health and day by day efficiency. Heating, ventilation, lighting, and plumbing exist to provide healthful and comfortable operation. A constant temperature is more healthful, even though it's more expensive than a variable one. A continuous flow of fresh air without drafts is better than window ventilation. Light at a fifty-foot candle level gets better classroom performance than at a six-foot candle level. Inside toilets are better than outdoor privies. Each of these "better" things costs more. Fluorescent lighting, initially more expensive to install, is cheaper to operate than incandescent lighting. Mechanically operated furnaces perform at less total cost than handfired furnaces.

Choices have to be made in each of the areas mentioned above. The intelligent, well-informed person chooses the facility which provides the best and most efficient operation over the long period of time. Without full information, the wrong choice may seem more desirable.

Debt Service

The principal must be especially aware that debt service can become so burdensome as to impair the educational program. Where school buildings must be put up rapidly because of urgent needs, the local district may assume a burden far out of proportion to its ability to pay for all necessary costs. For example, the school buildings that a community needs may have to be erected in a 10- to 15-year period. The community will have to carry a tax burden which a decade or two ago could have been carried over a 20- to 50-year period. These new conditions pose extreme hardships. When the burden of debt service for school construction goes

much beyond 15 to 20 percent of the district's operating budget, the burden is becoming extremely heavy. Another "rule of thumb" criterion of school construction load is the relation between the charges for debt service and full valuation of property in the district. The load is getting heavy when the debt service requires a rate of tax of two dollars a thousand on the full valuation of the school district.

Comparisons of Cost

Three major methods are used in comparing school construction costs. Each of these is far from perfect and yet, because all three are widely used, each school principal ought to know their shortcomings and strength.

The first is the cost per pupil. It is a reasonably good measure except that it tells us nothing about "how much" education is made available to each pupil.

A considerably less useful measure is the cost per classroom. This measure takes no account of the auxiliary spaces, the size of classrooms, or the facilities provided within classrooms.

A third method is the cost per square foot or per cubic foot. This also leaves many variables up in the air. It can be helpful if used with a knowledge that many things affect this measure which are not contained in the simple statement of cost. Obviously, some kinds of square foot cost are much more expensive than others. Square foot costs of a gymnasium itself may be reasonable, but become considerably more expensive when the cost of locker space, showers, and so forth is added.

There are many other cost elements which do not materially affect the educational program. For example, as has been mentioned elsewhere, the geographical location of the school building can be a major factor in cost. Warm climates obviously have considerable advantage in requiring little or no heat and a lighter construction.

The time of the year when bids are asked for may make a great difference in the cost of a building. If the construction firms in the area are busily engaged in other types of construction, the new school building is bound to cost more since someone is going to have to add equipment or the district will have to choose a less efficient builder. If, however, a number of builders are looking for work, the bids will be lower. Also, market conditions with regard to the materials to be used can make a great difference in the cost at any given time.

Interest rates on bonds often make a tremendous difference. Just a mere one-half of one percent on a million dollar bond issue means a difference of $5,000 the first year. If these bonds are amortized over a period of twenty years, the difference in cost will be approximately $50,000.

The district's credit rating also affects the interest rate. The determination of a credit rating is complex but careful fiscal planning will improve it.[2]

Common Misconceptions

There are many misconceptions with regard to school buildings. One cited most often nowadays is the year-round school. Arithmetically, it is quite easy to prove that at least a quarter of the school construction dollar is wasted every year because the building isn't in use during the summer months and because of the long holiday vacations. Most informed persons have long since concluded, however, that it is a delusion to think the year-round use of schools will save the cost of constructing new buildings. The plan doesn't work. First of all, it doesn't work because the parents in most communities are not interested in it. The plan has been tried

and found wanting over the past forty years in at least a dozen places such as Newark, New Jersey; Amarillo, Texas; Omaha, Nebraska; and Nashville, Tennessee. Furthermore, if a school building is in use for the entire year, there will be a number of additional costs in connection with maintaining and operating the building.

Another common misconception in regard to buildings is that the standardization of school design and construction will save a great deal of money. Standardization does make for savings in every form of production. Many items of construction can be standardized and have been throughout the nation.

One proposal is for prefabricated schools or factory-built schools. While some have been erected, there is little evidence that they are cheaper in the long run than the conventionally built schools. Much of the saving lies in the fact that the prefabricated schools are cheaper in the first place than the ones which the community would normally buy. Furthermore, the educational efficiency of factory-built buildings is considerably less than those designed for the particular community in which it is being built. If the people of a community are not concerned with education and if the educators have no unique ideas for the program, then perhaps a prefabricated school will serve as well. If there are local needs and if the community differs from the average, the prefabricated school is likely to have many shortcomings and may very well not provide the kind of educational program which the community desires.

Third, there is the misconception that a two-story school is more efficient and less expensive than a one-story school. By and large, unless site costs are extremely high or unless the site is very difficult to develop, a one-story building will be less expensive than a two-story building. The contention that the second floor saves because there is only one foundation and one roof neglects the fact that there must be extra fireproofing to make the building safe and that extra space must be used for stairs and for pupil traffic arrangements. Fire escapes for two- and three-story buildings add to the cost. The tall building is today not necessarily more efficient and economical to heat.

Summary

The financing of the school building program involves a discussion of many different areas. First of all, practically all the same elements of the general school finance program are involved in the finance plan. The source of revenue, the tax base, and methods of taxation are exactly the same as the similar items in financing current expenses. Distribution of state funds to the community, however, may differ somewhat since the need for school construction is not necessarily continuous. Also the usual methods of raising funds initially for capital outlay deal with a whole new area of finance. While a knowledge of all these elements of the finance program is important to any school administrator, certainly a most important knowledge for a building principal is how the addition of a new building may affect local school costs. This he must know in order to be able to work intelligently with members of the lay community and other educators on school construction programs.

Current controversy over the cost of school construction makes it imperative that administrators generally know the cost of elements in school construction and some of the interrelationships among various costs. It is well, too, to be able to understand and interpret the cost figures commonly used. Finally, administrators should always be on guard against some of the widely held misconceptions in regard to cost.

Legal Aspects of School Building Programs

Madaline Kinter Remmlein

THE success of a school building program rests upon cooperative planning for desirable objectives and achievement of those objectives through the participation of the school board, the school superintendent, the building principal, teachers, pupils, patrons, and citizens in general. A common urge to have the best possible school to meet the needs of modern education is essential; no less important is the necessity for understanding the extent to which the planners may deviate from tradition and from standards, the procedures that must be followed, and the location of responsibility at each step in the program. These are the legal aspects to be discussed in this chapter. They are important because fixing the objectives and achieving the objectives may be hampered or facilitated by these legal aspects.

State Power over Local Discretion

Public education is a responsibility of the state. On this general principle rest the rulings of the majority of state courts that the real owner of school property is the state and that the state may prescribe standards and procedures to be followed by its local agents. In practically every state, the legislature has clothed the chief state school officer and/or the state board of education with authority in the area of school building construction. In practically every state, the legislature, and the state board of education, and/or the chief state school officer have delegated certain responsibilities to local school officers—the county or district board of education.

The first questions the planners of a building program should answer are what is prescribed by the state, what parts of the state standards are directory as contrasted with mandatory, and what decisions have been left wholly to the discretion of local authorities. Answers to these questions will differ from state to state. Indeed, within some states the answers will differ for different sizes or classes of school districts or for different sizes or types of school buildings. Nevertheless, an answer to each of these questions is an essential point of departure in any planning program.

School building sites must be approved by the state department of education in at least certain types of school districts

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or for at least certain types of schools in about half the states. Certain nonschool state agencies must approve building plans in some states: the Administration Building Council in Indiana, the State Board of Health in Maine and Vermont, the Department of Industrial Relations in Ohio, the State Fire Marshal in Vermont.

In about one-fourth of the states, some nonschool local governmental agency's approval is required. The city architect, the city engineer, and other municipal officers are frequently required by law to assist in planning a school building.

When a state requires approval of the site or the building plans by any designated state or local agency, *approval* is the requirement; but this does not mean that these agencies have primary authority. It means that local proposals must be submitted for approval. On the other hand, however, if any of these agencies has issued regulations setting forth standards that must be met prerequisite to approval, local proposals must at least meet these standards, unless they can be proved to be an abuse of authority.

The purpose of standards fixed by state legislatures and the agencies to which the legislature has given approval power is to ensure that local proposals meet certain minimums. The standards are not fixed in the sense that a local program cannot deviate therefrom, so long as the deviation is in the direction of a higher standard.

The state department of education is required to prepare plans for small school buildings (but not for large buildings) in about half the states. Occasionally, the law requires that the state department have responsibility for preparation of building plans for buildings of all sizes and types. None of these laws implies that the state department is to require each school district to accept a stereotyped plan it has prepared. The law sets forth a duty on the part of the state department as a service to facilitate local school building planning, but if the local planners prefer a better building, or one that deviates from the usual, they have the legal power to achieve it provided it meets minimum standards, is eligible for approval, and can be adequately financed.

Status of Superintendent and Principal

The district superintendent is the executive officer of the local school board and the chief administrative officer locally. He has great responsibility in any school building program. Especially in districts where the superintendent has a number of buildings in the school system, he must rely on the building principal for specific information pertinent to that particular school program, personnel, and pupils—the needs to be met in the new building. The building principal is an agent of the school superintendent.

The principal is not relieved of his part in a building program because the primary responsibility rests on the school board and the superintendent. The availability of a school board attorney does not mean that he alone has, or should have, a "corner" on knowledge of school law. Each step of the building program has its legal aspects; each group of school personnel and laymen participating in the planning and the carrying out of the plans can work more efficiently and more harmoniously if they, too, have school-law principles in mind.

The principal serves as liaison between the school board, the superintendent, the school board attorney, the architect, and the building contractors on the one hand and the teachers, pupils, and citizens on the other hand. He, more likely than any other person, may be called upon to explain why certain decisions must be made and why certain other decisions cannot be made. To do this, he must understand the basic provisions of school law.

Responsibility of the Architect

The architect has the legal responsibility to see that the contractor meets the specifications. Too often, school personnel leave too much to the architect. It is not always possible for the architect to make daily inspections and, if his contract imposes on him only general responsibility, defects can easily escape his attention.

In the construction of a building in New York recently, the subcontractor failed to insert a felt barrier in the roof, resulting in damage of approximately $10,000 to the gymnasium ceiling. The board sued the architect as well as the contractor. The court pointed out that the architect's contract called for him to "endeavor to guard the Owner against defects and deficiencies in the work of contractors" but that supervision of the work by the architect was "to be distinguished from the continuous personal superintendence to be obtained by the employment . . .[by the board] of a clerk-of-the-works." The architect made weekly visits as was customary in the profession in that area and the court found he was not responsible for the damage—his contract gave him only general supervisory responsibilities.[1]

Sometimes defects cannot be discovered prior to occupancy. Even though the architect may have given the contractor a certificate to the effect that the building has been constructed in accordance with the specifications, the board may sue the contractor for breach of contract, or withhold final payment until the contractor corrects the defect.

Functions of Staff, Pupils, Citizens

Helpful suggestions and understanding of problems result from participation in the building program by the staff, the pupils, and the citizens; but, as has been said at several other points in this book, legal responsibility lies elsewhere. Part of the task facing the building principal is to indicate in a diplomatic way that not all suggestions can be carried through and that those proposing these suggestions have no power to force favorable consideration of their proposals. At the same time, he must encourage as much active participation as possible.

There are certain things that a school board cannot always do. Citizens groups and teachers organizations can take over many of these jobs. One such is preparing and distributing campaign literature before an election to convince the voters of the need for the new building.

Election Campaigns

Some state laws require a vote by the electors of the district as to whether or not a new school is to be erected, where it is to be located, and how it is to be financed. Before voting, the electors need to be educated. Can a school board publish materials designed to convince the voters that they should approve the proposal? Maybe yes; maybe no.

A New Jersey court held that a school board had exceeded its powers and misused school funds when it published a brochure giving the facts and making the appeal to vote "yes" in the election.

The court would have held the issuance of this booklet to be valid if the communication had merely given a fair presentation of the facts that would include, necessarily, the consequences, good and bad, of the proposal, the increased tax rate, and such less desirable consequences as could have been foreseen, as well as the anticipated improvement in educational opportunities resulting from an affirmative vote. The court said, "If the presentation is fair—the power to make reasonable expenditure for the purpose may fairly be implied as within the purview of the power, indeed duty, of the board of

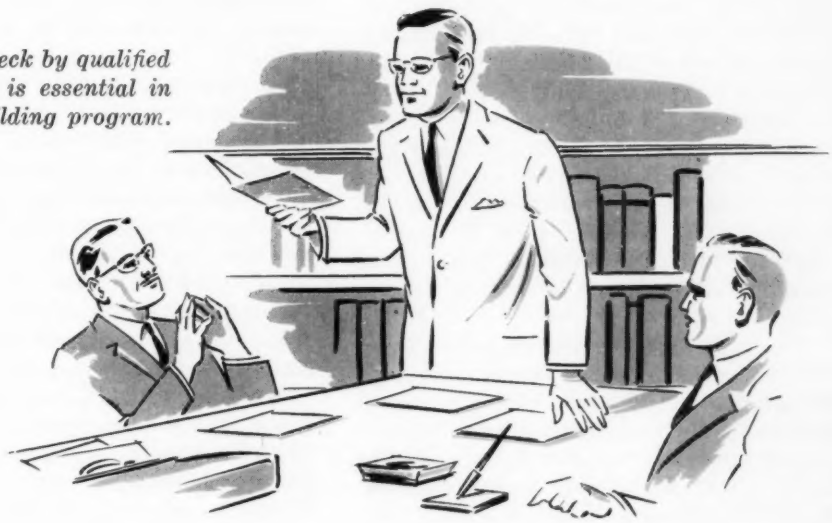
education to formulate the construction program in the first instance."

Although the issue was moot by the time it reached the appellate court, and hence the election was declared not to have been invalidated by the procedure, the court said: "But the defendent board was not content simply to present the facts. The exhortation, "Vote yes," is repeated on three pages, and the dire consequences of the failure so to do are overdramatized . . . In that manner the board made use of public funds to advocate one side only of the controversial question without affording the dissenters the opportunity by means of that financial medium to present their side, and thus imperilled the propriety of the entire expenditure. The public funds entrusted to the board belong equally to the proponents and opponents of the proposition, and the use of the funds to finance not the presentation of facts merely but also arguments to persuade the voters that only one side has merit, gives the dissenters just cause for complaint." [2]

Rarely does this issue come before the courts, but the New Jersey decision is in accord with older decisions where cities have been held legally unable to promote a bond campaign with municipal funds.[3]

However, at about the same time that the school board of Parsippany-Troy Hills Township became involved in the New Jersey case, a group of citizens in Detroit were unable to stop the board of education from distributing a similar booklet. The court there held that the expenditure was proper because it was for a public purpose in the interest and welfare of the school district, the board having made a decision in advance that the bond issue was needed to properly and adequately maintain and operate the schools.[4]

It must be pointed out that the Detroit decision was in a county court and that the New Jersey decision was in the highest court of that state. Therefore, greater



A thorough check by qualified legal advisors is essential in any school building program.

reliance should be placed on the New Jersey holding and where the issue has not come before the courts, a board of education would be well advised to turn over this part of the program to lay groups.

Procedure in Selecting Site

Statutes, regulations, court decisions, and dissertations on the legal aspects of school building construction go into details concerning selection of the site, bids for construction, contracts, and performance bonds—details which are too voluminous for inclusion here. A brief discussion of the general principles on sites and bids will be used as examples.

Selection of a building site is usually considered the first step in a building program. It is not necessarily so. The type of building to be erected will affect the decision as to where it is to be located. Therefore, in some instances preliminary planning of the building should precede selection of the site.

The procedure for selecting a building site is usually prescribed by law. Although the courts have ruled that minor deviations from any prescribed procedure do not invalidate a decision, one needs to know what the courts might consider minor deviations as contrasted with substantial deviations that would invalidate the decision.

Montana law requires that electors vote on location of the building site *at the same time* that they vote on the bond issue. The court held that it was mandatory for both questions to be voted upon at the same time, even though in this particular case the site was not to be changed and the only question was a bond issue to erect a new school on the same site. The bond election was invalid because the ballot did not name the site.[5]

Kentucky statutes are silent except to empower the state board of education to promulgate regulations. The state board did institute regulations, including the necessity of having school building sites approved by the state department. In one county, the board purchased a site not only in disregard of the approval regulation but also at a location contrary to a former recommendation of the state department, and did so after litigation had begun protesting the intended selection. The court held that the board had acted in an arbitrary fashion.[6]

A few years later, dissenters relied on that case, unsuccessfully. In that county, the board had placed the building near a county line instead of at the geographical and population center, but had done so for good reasons that were approved by the state department.[7]

These and other cases illustrate the principle that if no statutory procedures have been imposed, local school authorities have discretionary authority for the selection of sites, and courts will not usually interfere with the exercise of discretionary power of any public body—but will set aside decisions that are arbitrary.

Where statutory provisions do exist, procedures for the selection of a building site can usually be separated into those which are mandatory and those which are directory only; in the latter group, the school board has discretionary power.

Bids for Construction

Calling for bids on the construction of a school building is practically a universal requirement. The purpose is to prevent the board from giving the contract to a favorite contractor and to obtain facilities at the lowest possible cost.

After the bids have been opened, the board cannot change the building plans materially. Major changes cannot be made because to do so would be unfair to the bidders who did not get the contract.

However, unforeseeable minor changes can be made without calling for new bids. Also, the board may reject all bids and replan the specifications for a new bid. The contract must conform with specifications set forth in the call for bids.

It is a general principle of law that the contract should not be let to a contractor in whom any board member has a personal or financial interest. Sometimes, especially in small towns, this principle creates difficulty. However, if the interested board member abstains from voting and *the public knows that fact*, it is probable that no one would challenge a contract provided the contractor submits the lowest responsible bid.

A board must award the contract to the lowest responsible bidder. If the word "responsible" is not in the legal requirement, the prevailing view of the courts is that the board must award the contract to the lowest dollar bidder; although there is a minority view that the board need not deal with the lowest dollar bidder if it can show that he is not a responsible contractor. The courts will not permit weeding out the irresponsible contractors before sending out a call for bids.

If one bid is far below the others, the board is put on notice that a mistake has probably been made and it cannot accept the bid holding the contractor to the amount. Small errors that the board could not be expected to notice do not excuse the bidder.

The Importance of Safety

The building should be constructed well, obviously. It should be, however, not only a well-constructed building but also a safe building.

Mention is made elsewhere in this book that the playground should provide for parking of bicycles. In one central school in New York, the younger children were sent to play on the school grounds until the older pupils were released at the time the bus was to arrive. They were in charge of two older children. After the older pupils were dismissed, the two "supervisors" left. One eight-year-old boy got into a scuffle with another little boy who knocked him over in the path of an oncoming bicycle ridden by an older student. He was severly injured. In describing the circumstances, the court left no doubt that the situation was unsafe to the point of negligence. "Some forty or fifty town students used bicycles to ride to and from school. Some of the bicycles were left in a bicycle rack when not in use, and others were left standing along the front entrance to one of the school buildings. There were no rules or regulations prescribed by the Board of Education concerning the operation of bicycles on the school grounds, and the principal had made none. Bicycles were ridden at times over the playground and on the lawn where the smaller children waited their buses. On several occasions children had been struck." [8]

Negligence lay not only in allowing the bicyclists to use the playground and lawn but also in not having corrected this dangerous situation after the first child had been struck. Since this accident occurred in New York, the injured could sue the school board. Had it occurred in most of the other states, the only redress would have been through action against the principal.

At the beginning of this article, mention was made of the necessity for each individual to know the scope of his own responsibility. A Kentucky principal exceeded his ability, and probably his responsibility, when he installed a water fountain and, unfortunately, hooked it up to the water boiler. A child who leaned over to take a drink was scalded in the face with boiling water. Suit was taken against the principal, the maintenance supervisor (for failure to inspect the in-

stallation), and the janitor (for failure to shut off the water after he saw that the fountain was not properly installed).*

Undoubtedly, many other injuries occur as a result of well-intentioned school personnel who undertake repairs outside the scope of their capabilities.

Safety cannot be assured to the extent of a guarantee that no injuries will occur; safety should be assured to the extent of a guarantee that no injuries will occur through negligence.

Negligence is action which a reasonably prudent person could have foreseen might lead to danger and it also is lack of action to prevent a situation that might become dangerous. Each individual is liable for damages for injuries resulting from his own negligence. The fact that school personnel are public employees does not relieve them of this responsibility.

The building principal has an added duty—he must not only guard his own actions against negligence but also promulgate rules and regulations for his building and watch over the actions of his teachers and other personnel to see that they do not fall into negligent ways. Therefore, principals are under a duty to know when an unsafe situation exists, to see that unsafe equipment is out of use, to see that proper repairs are made. A principal could be held liable for a dangerous condition which he should have known about even though he may be able to prove that he actually did not know. Study of the law of torts as applied in school law is an essential for all school principals.

How To Learn About Legal Requirements

Study of school law in general is helpful background. State department publications are usually available. The school laws of the state should be on every principal's desk. Interpretations of the school laws frequently amplify or modify literal statutory provisions and the principal should be able to find any existing case law on each act of the legislature.

Fortunately, a principal does not need to have legal training to find these sources. Secondary sources are probably sufficient for his needs. A number of school law publications have brought together statutory and case law on particular subjects, including school building construction and tort liability. The following bibliography names a few of the more recent publications which each school principal should study.

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Remmlein, Madaline Kinter. *The Law of Local Public School Administration.* New

York: McGraw-Hill Co. 1953. Chapter 4, "Buildings and Sites," p. 111-136.

Another most convenient source of case law is the Annotations included in the American Law Reports which is now in its second series. The index will help a principal find Annotations on particular subjects with which he is concerned. For example, "Differences in character or quality of materials, articles, or work as affecting acceptance of bid for public contract" covers the right to reject any and all bids in section 4, provisions stipulating "lowest responsible bidder" in section 5, and provisions stipulating "lowest bidder" in section 8.[10]

"The title to buildings when school lands revert for nonuse for school purposes" is the subject of another Annotation [11] and "the validity of submission of propositions to voters at bond election as affected by inclusion of several structures or units" is another in which sections 12, 13, 14, and 23 relate to school buildings and playgrounds.[12]

Volume 47 of American Jurisprudence contains the title on "Schools" and Part VI has to do with "School Property and Buildings." These 14 sections summarize the general principles of law with copious footnotes to cases where the principles have been applied. Similar in style to American Jurisprudence is Corpus Juris Secundum. "Schools and School Districts" is the pertinent title in this service and it is found in volumes 78 and 79. Sections 239-269 in volume 78 are concerned with school buildings and sites. These are all helpful references.

When Change Is Due

After study of the statutes, state board regulations, municipal building codes, and the pronouncements of the courts from all these sources, a principal may feel dissatisfied with the *status quo*. Such a one will find solace in the concluding paragraphs of this article.

There is nothing sacrosanct about state laws, state board of education regulations, rulings of the chief state school officer, or municipal building codes, in the sense that they are not subject to change when their application in a particular set of circumstances can be demonstrated to create a hardship. Today's state school officers and even city councils listen to recommendations from persons, individually or in groups, who approach them with recommendations for change that are founded upon objective supporting evidence. No need to grumble about or blindly accept undesirable standards when it is possible to follow legal avenues to obtain their improvement.

If a state law prescribes a standard or a procedure that is not in the best interests of your building program objectives, ask your legislator to sponsor either a relaxing of the prescription or an exemption for school districts under your circumstances. If a state board regulation is your stumbling block, the state board probably has discretionary authority over the particular issue and can be persuaded that your needs require a different disposition. If it is a municipal ordinance with which you are coping, seek special consideration of your problem from the city council.

Laws, regulations, and ordinances are adopted to fit the "average" situation. If you can furnish evidence to prove that your situation differs, legal boundaries designed for the "average" should not handicap you.

Furthermore, such efforts on behalf of your own program may result in a change which is in the best interests of the "average"—and then you will have the satisfaction of having done your part in obtaining a legal improvement beneficial to all the school children of the city or state.

THE SCHOOL PLANT

The site may be a wind-swept hill or a tree-studded valley; the building may sprawl or be snugly compact; classrooms may be intimate and enclosed or merge into a corridor or the out-of-doors. Whatever its features, each school plant should be judged against the measure of its contribution to the instructional program.

Site Planning and Development

Robert Trask Cox

IN these days of millions and billions—millions of people, billions of dollars, millions of babies, millions of students, millions in taxes—the school building program has become a matter of close personal concern to all of us. To the elementary school principal, it is of vital concern. As an individual, schools are his habitat and education his profession; as a principal, he may be involved in the planning of a building program; as an administrator, he will need more and more building program knowledge and experience as a prerequisite to advancement; and as the school official who personally, more than anyone else, represents the schools to the public, he, in the guise of a public relations expert, must be able to rally support for the building program.

As individual, principal, administrator, and public relations expert, the elementary school principal must have a fundamental grasp of the underlying philosophy, the mechanics, and the facts behind the school building program. To be most effective, he must be a convinced advocate of long-range planning, with a weather eye to the future. Of necessity, he will be acquainted with the basic principles and techniques of enlightened school planning. He will be aware of the major functions of the chief participants in the building program, including those of the superintendent, the governing board, state and federal agencies, the architect, inspector, contractor, and subcontractor. He will be conversant with the source and supply of his district's building funds and will have the general picture of his district's anticipated future enrollment well in mind.

To the principal, then, this article is addressed.

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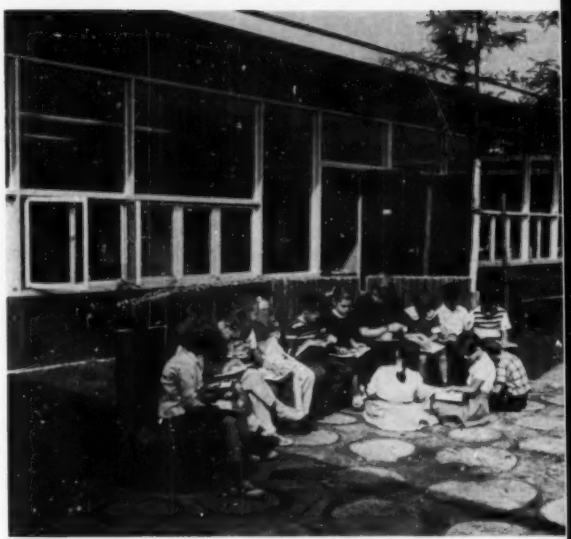
Site Planning and Development

In school building, there is an inseparable trinity of design elements which makes or breaks a school plant. The first element is site selection, the second is site planning and development, and the third is building design. Basically, site planning and development is that part of the school building project having to do with the preparation of the ground, the location of the buildings, and the design and location of the various outdoor elements of the school plant. Next to the cost of the buildings, it is often the largest item in school building budgets. Generally, buying the site costs less than developing it.

Of all the facets of school design, site planning and development is the least exploited and the most neglected. Although it is generally recognized that the school plant of today with its larger site is a significant influence in the life of

a community and plays an important part in establishing and maintaining the tone of a neighborhood, school sites in general are still only partly developed and partly used. Basically, this is due to a lack of understanding of how imaginative and thorough site planning can affect the use and the cost of the school plant, in terms of both development and maintenance.

Even the most uninitiated can understand the importance of the technical aspects of site planning such as topography, soil analysis, drainage, grading, and utilities. These technical matters are, of course, very important cost-wise. There are, however, less technical matters involved in site planning which should be of great concern to the administrator and board member. Since these less technical matters are apt to be taken for granted, their importance is often not fully realized. Location of buildings, outdoor education, and physical education facilities; access, loading, and service; parking and walks; traffic and circulation are some of these vital items.



Making the out-of-doors part of the classroom

Site and the Instructional Program

A well-planned site which is fully developed is in itself an important educational tool in the hands of the school administrator. Both the academic and the physical education programs are shaped by it.

On the academic side, the indoor teaching space is being extended into the outdoors. It is not uncommon to have two classrooms per teacher: one, the conventional one-story indoor teaching station; the other, the outdoor classroom, separated from its indoor counterpart by ample low-sill windows and glass doors, sliding or hinged, which permit visual control and easy access from indoors to out. With a little ingenuity and a slightly increased budget for extra paving, shelter, space separators, outdoor classroom sink,

and equipment storage, the school has new space which is rich with opportunities for teaching and learning.

A different approach to the use of the site educationally is encountered in England. There, sites are selected with an eye to making use of the natural environment as resource material. In sharp contrast to the United States tendency toward uniformity, the British Ministry of Education exhorts its educators and their architects to capitalize on the unusual, to fit their buildings to the natural contours of the land, to take advantage of the view, to achieve the organic environment, to preserve existing natural features, and to use trees or hedges, irregularities of the ground in the form of hollows or banks, a stream or a pond, as a means of adding character to the school. There, too, the approach to the outdoor classroom is in contrast to our commonly accepted concept.

> If the infants' class spaces are extended into the garden in the form of small paved areas, the siting and design need careful consideration. An unbroken terrace formation is seldom the best solution, even if sub-divided by screens of planting, mainly because the hard surface throws back heat and sound, and in bright weather is glaring and uncomfortable to look out upon. Although supervision from within the room is certainly easier when the paved area is close to the building, it may sometimes be possible to move it away a little, with a wide dry path leading to it past interesting bits of planting, or perhaps a pond or a sandpit.[1]

Although this approach is obviously limited to the small rural school, the general attitude as well as this specific one expresses a concern for the welfare and inspiration of the human spirit which is too rarely evidenced in school planning in the United States.

The relationship of proper site planning and development to the physical education program is much more direct. A certain number of children use a certain amount of space and equipment at the same and at different times. If properly designed space is available, the program is a full one; if not, the program is curtailed. Curtailment of the large muscle activity involved in outdoor games and play raises havoc with the sedentary activities of the indoor classroom. Enforced physical inactivity makes the learning process difficult if not impossible for the child and is guaranteed to produce antisocial teachers. This underlines the necessity for careful analysis of the physical education program by the educator in terms of group size and time schedules and for thoughtful planning by the architect.

The well-developed physical education facility is planned in accordance with several basic design criteria. It is, first of all, as all-weather as possible. Safety is a major consideration, particularly in regard to the relationship of apparatus areas to circulation and adjacent play areas, and the entire playground area to bordering streets, drives, and parking areas. A high degree of flexibility and fluidity in assignment of space for changing activities and sizes of groups is provided. Segregation of age groups is accomplished by location rather than by means of fixed barriers which limit the flexible use of paved and turfed areas. Multi-purpose courts and portable equipment are used extensively. Intensity of use and minimal disturbance to classes in session are prime determinants in the location of the various elements of the facility.

Recreational Uses of Site

Recreational use after school and on weekends is a major factor in site design.

Where such planning criteria are absent or the site is inadequately developed, the resulting disuse of the site is immediately apparent and usually objectionable, both visually and educationally. It is an indicator pointing to the existence of a poverty-stricken educational program.

The recreational values inherent in a well-planned site are considerable, especially in urban surroundings. This is most apparent in the large city school in a slum area where a new and well-planned plant with its playgrounds open to the neighborhood after school hours is of tremendous benefit to the child and to the community.

Cooperation between school and community recreational agencies early in the site acquisition and site planning stages can result in a high utilization of the school site, gladdening the heart of the thoughtful taxpayer. Sometimes, facilities which neither school nor community could afford alone become possible through such cooperation. In one case, a school district agreed to lease a proposed swimming pool with dressing facilities for the school year. This income enabled the community to see its way clear to voting the necessary bonds and constructing the facilities, thereby permitting the school to offer a rich swimming program and providing the community with a much needed summer recreational opportunity.

In climates so severe that high use of site is limited to spring, summer, and fall, it becomes even more necessary to plan for joint use of site by school and community. The school site is more and more becoming the last green spot left in a totally built-up suburbia. A generous site therefore becomes a natural resource not unlike a national park and should be so regarded. Under these circumstances, the school board and the community share a moral obligation to plan for its public recreational use as a part-time park, picnic ground, or ski slope, or at least as one small area where contact with nature is still possible.

Beauty

One of the most important products of good site planning and development is beauty. It is most important that beauty be a normal part of the student's surroundings. After all, during most of his impressionable waking hours he is being influenced, consciously or unconsciously, by the atmosphere of the school.

The importance of beauty in our daily life should not be underestimated. The need for beauty is especially apparent in our increasingly materialistic society where spiritual concepts are apt to be trampled underfoot in the frenetic struggle for the dollar. Despite the huckster attitude, beauty is still a powerful motive in the life of the individual. It plays a major part in the search for a wife or husband, in determining the house or car to buy, in choosing the place to dine and and the dress or suit to wear.

Even the member of the taxpayers association who most loudly opposes the expenditure of public funds for anything but the cheapest and barest of necessities is similarly motivated. For, as time passes and the strident cries of this crucified taxpayer die down, the beautiful school remains; the cost becomes a dead issue and is then forgotten. Finally, the now mollified taxpayer entertains his visiting relatives from Nebraska by showing off the pride of the community, the beautiful school.

In a school plant, beauty makes itself felt in many ways. The child feels happier, learns more quickly, and is prouder of his school. The teacher has more stamina, is more patient and more relaxed. The need for discipline is lessened and vandalism is negligible. Custodial and maintenance costs diminish. If there were only a sure-fire way to incorporate

beauty into every school plant, it could soon be proved that beauty is one of the most cost-saving elements of school planning.

Even the citizen who never crosses a school building threshold from one year's end to the next feels its impact. The atmosphere created by the way the buildings are located and by the landscaping will be of major importance in conditioning his attitude toward public school education, even though this may seem far-fetched. A grubby-looking or incomplete school plant creates an unconscious antipathy which is easily translated into complete apathy, passive hostility, or active opposition to schools in general. How many stay-at-homes in a school board election, how many "no" votes in a bond election would have been responsive "yes" votes had there been a cheerful, well-planned, landscaped school along the way?

Consider, too, the effect on the neighborhood of a trim, warm-looking school on a large site developed for school and community use. Consider the pleasure to eye and spirit of pleasant landscaping, adequate parking and the absence of traffic problems, and an over-all feeling of welcome and stability. Are property values affected? Is community spirit fostered? Does a friendly neighborliness grow? Are communal activities engendered in increasing number? Is public education supported? Are more votes cast? There can be little doubt that the answer is a resounding "yes."

Economics

Good site planning implies complete site development when the school plant has reached the enrollment for which it was designed. Complete site development costs money, but the funds must be forthcoming if the desired environment for our schools is to be provided.

Choice of site greatly determines the cost of site development. Cost-conscious school boards out shopping for sites should be as sensitive to the cost per acre of developing the cheap site as they are to the cost per acre purchase price. A ten-acre site for an elementary school in a rural area may cost $10,000 for the land. Developing it for first use may well run three times as much or more. A cheap site may turn out to be exorbitant when site development costs are added to the cost of the land. By the same token, land which is given to the school district as a gift may, by the time it is developed, be too expensive to accept.

Under-developing a site is costly, too, and in more ways than one. If the most important results of good site planning are to be produced—beauty, order, and stability in the student's scholastic environment—the school site must be developed along with the building construction. Failure to do this hurts educationally and is costly in morale as well as in dollars and cents. However, in spite of this, there is a reluctant but general acceptance of the under-developed site as one of the growing pains of an accelerated school building program. This is a real problem, educationally, psychologically, and financially, and it deserves more attention.

In too many fund-starved districts, under-developed sites are the rule. In the large metropolis where maintenance funds are inadequate, there is the completed underdeveloped school site which is completely paved except for token landscaping at the entrance. In the smaller community where building funds are limited, there is the incomplete underdeveloped school site which is graded enough to provide an approach and leveled for the buildings and a token play field only. When lawn, landscaping, and sprinklers are omitted, and walks and paving are curtailed to save money, new

buildings soon grow old and custodial and maintenance costs rise astronomically. This every good housekeeper knows. But far more costly is the attendant lowering of student and teacher morale and the loss of public support for the schools.

How Is Site Planning Accomplished?

Site planning, like every other sort of planning, involves imagination, evaluation, and compromise and demands cooperation and coordination. Like other areas of school planning, it requires first an educational program. No matter how roughly outlined, the educational program must come first, and first means before site selection and before the development of a district master plan. Next comes the architect, and next means before the start of site selection. It is obvious that highly skilled technical and professional advice is essential if all the factors of importance in site selection are to be considered. And as has been pointed out, site development costs are greatly determined by the characteristics of the site selected, and a knowledge of these costs is as essential to the site committee as is the asking price of the prospective seller.

The scene so far includes, in order of appearance:

1) the educational program and the educational consultant if his services are required;
2) the district master plan;
3) the architect, if he has not already put in an appearance in the development of the master plan; and
4) the site.

Once the site has been acquired, the legal description, topography, soil analysis, climatic characteristics, drainage, utility factors, and other technical characteristics can be determined. With these, the architect, working with the school administration, derives from the educational program the material necessary to form a coordinated design for both buildings and site development. Many conferences must be held and many sketches made to develop the preliminary design.

At this point, it may be well to explain that, non-designing school authorities to the contrary notwithstanding, site planning can not be done in a vacuum. Planning of the school site must be concurrent and interlocked with the planning of the school buildings. To cite an example: grades affect the shape and size of a building, the use and location of the building affects the site plan; and so it goes. The building plans affect the site and the site affects the building plans. No planning worthy of the name, whether of a school, a skyscraper, or a house, can be successfully achieved if it is approached in a compartmented, uncoordinated manner. Successful planning is like a seven ring circus. There is an act going on in all seven rings at the same time.

As with the ring master in the circus who directs and coordinates the activities of a host of performers, the architect, as project designer, directs and coordinates the activities of the several engineers who, in this day of specialization, contribute the detailed knowledge required in their various fields. These include the civil engineer for grading and drainage, electrical for power and light, mechanical for plumbing, heating, ventilating and air-conditioning, structural for the mathematical design of walls and structures, acoustical for sound-reinforcing, sound-deadening and sound transmission, and the landscape architect. Is it any wonder that the final design for a six hundred student elementary school in California will consist of some seventy 24″ x 36″ sheets, to say nothing of the two hundred or more 8½″ x 11″ pages of specifications? The many heads involved in planning, the complexity of the problem, the size of the investment, the influence of the

school, the number of people influenced by it, the fifty year long period of influence—all go to emphasize the value of ample time for preliminary planning. This is the most critical period in a building program but unfortunately, almost tragically, this is not widely recognized or acted on.

What Is Good Siting and Development?

Good site planning is long-range planning and every school site plan in these days of burgeoning population must be a long-range master site utilization plan. This sort of planning is an attempt, feeble or not, to part the curtains and look beyond into the future. Too much may not be discernible, but the approach is sound. With this approach, the educator and the architect will least inhibit the education and housing of generations yet unborn.

With long-range planning as a basis, the master site plan will consist of four elements: plans for what exists in the present, what is planned for the immediate future, what is planned for the forseeable future, and an educated guess as to what may happen in the unforseeable future.

As initially stated, this article is directed to the elementary school principal—a professional with a problem-solving approach to his professional activities and a genuine concern for children. This attitude is basic to sound school planning. It is not the intention here to make a professional planning expert of the reader, nor is it intended to load him down with pat solutions and heavy-handed rules of thumb. In this instance, what is sauce for the goose may not and probably will not be sauce for the gander. The following is not to be taken as a check list nor as a set of standards, but merely as observations on various aspects of site planning and site development.

Sites: Sites are never the same; no single planning solution can be the best for all sites; local conditions will determine what the best solution is.

Access: In addition to providing a safe and convenient approach, the entrance should give as warm and generous a welcome to the school as possible. The latter point is of equal importance and is too often neglected.

The frequency of service deliveries to the elementary school cafeteria does not usually justify a single purpose drive or service yard.

To separate bus loading from parent pick-up in the larger school is salutary.

Planning for garbage and trash pick-up is too often thought of at the last moment, unhappily.

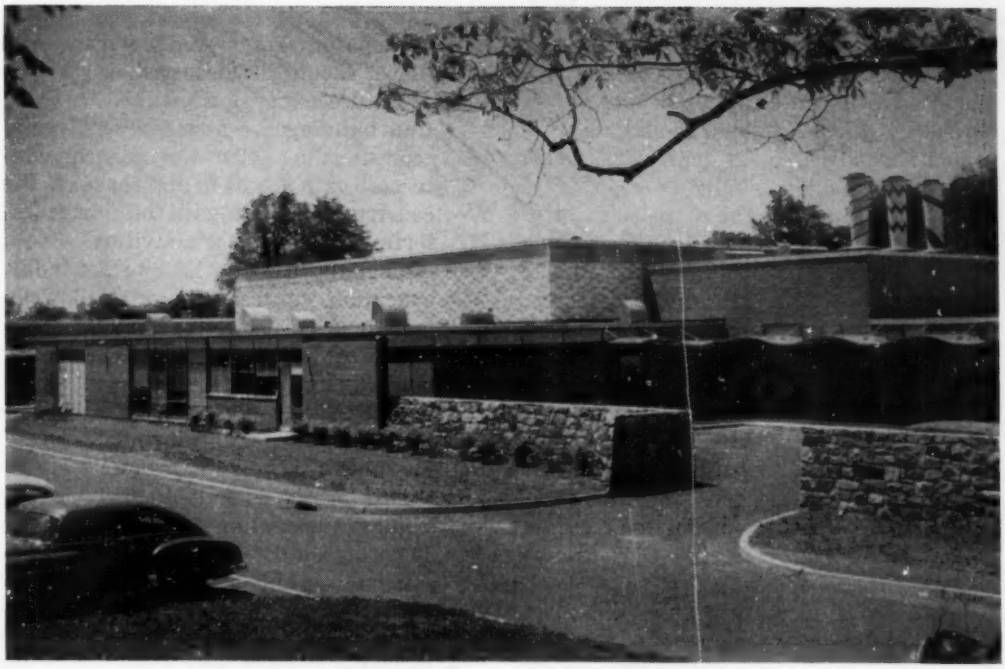
Parking: The dignity of the Capitol in Washington, D. C., is not enhanced by the parking lot at its east front. This sort of pandering to practicality and convenience should be avoided in locating parking areas on school sites; space and greenery at critical points around school buildings will do more for the soul than saved steps do for the body.

Making little ones of big ones is sound practice when it comes to parking areas; it facilitates egress, distributes traffic, minimizes the objectionable appearance of parked cars or empty parking lot.

Paving: No one admires a sea of asphalt, not even the operator of a power sweeper. Whenever large paved areas are necessary—and they often are—planting areas should be provided to break them up; a designed mixture of planting and paving can be very handsome.

Kindergartens: Fences or space separators completely enclosing the kindergarden play yard are a must.

If the harrassed mother can drop off her child in the morning (no double session) at the curb and from her car watch the child, guided by the lay-out, safely enter the kindergarten classroom undirected, then that is site planning of a personal sort which is greatly appreciated.



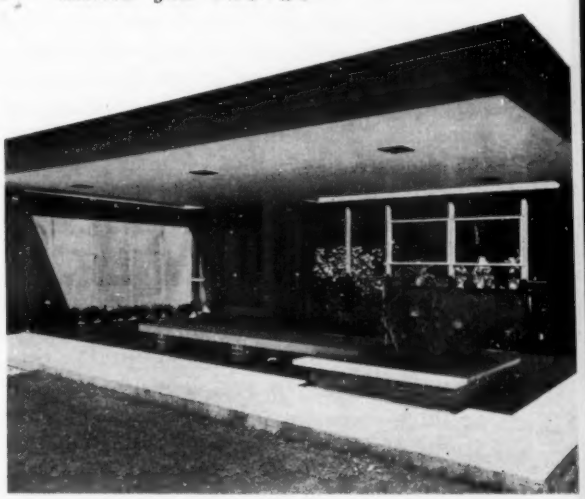
A well-designed driveway and parking area

Multi-use building (cafetorium): Children eat here then run for the playground, the Parent-Teachers Association meets here at night and the kitchen requires deliveries and pick-ups; hence, consider its relationship to the playground, its use when the rest of the plant is closed, its parking and service problems.

"Where is the auditorium?" is a question which should never need to be asked.

Administration: The adult visitor to the usual elementary school often feels as out-of-place as a spaceman on his first visit to earth. This is not necessary. Although a school is designed for children, the administration building or office should be located so that a member of the general public can find it without asking and should be designed so that he will not feel self-conscious. It should be welcoming, perhaps gay, and reflect full consideration of the needs of child, teacher, and public.

A school entrance that invites you inside



Classrooms: To avoid public criticism and probable legal complications, it is good practice to locate classrooms on the school site, not on adjacent property.

Toilets: Student toilets should be conveniently accessible to both classrooms and playground.

Toilet facilities for the recreational program after school should be accessible without unlocking any other part of the plant.

Playgrounds: The trend to blacktop as a playground surfacing material is in many respects regrettable. Granted that it permits greater flexibility and continuity of educational and recreational programs, and that maintenance costs are low. But we pay a high price psychologically.

Practice back-stops or handball courts should be so positioned that they can be visually supervised.

Turf is the most desirable, the most beautiful surface for playgrounds, but is expensive to maintain. Intelligent design and selection of plant material, however, can greatly reduce the cost of maintenance. If traffic to and from the playground areas can be broadly distributed and, where unavoidable concentrations of traffic occur, means are taken to avoid funneling and to make for fanning-out, worn-out spots on the turf can be avoided along with many maintenance problems.

Building Costs: Just as site development costs are influenced by site selection, so building costs are influenced by site plans.

Drainage: It is much cheaper to surface-drain the building area of a site than it is to use catch basins and an underground system. First cost is not the last, however, and the drainage system should be discussed early in the schematics stage. It can seriously affect floor elevations, slopes of walks, and net usable area.

Check Points: In reviewing site plans: in the schematics stage, concentrations of traffic of all kinds—car, bus, bike or foot —should be questioned; later, in the preliminary stage, the presence of banks, walls, steps or ramps, and differences in floor level should be discussed.

- Is future expansion planned?
- Can buildings be added to easily and economically? Can the general contractor gain access to and fence off the construction area with minimum interference to school activities?
- Has night use of the site for adult education, open house, or Halloween outdoor carnival been provided?
- What provisions have been made by landscaping and strategic paving to avoid tracking dirt inside?
- Are sand traps with gratings required in walks at student entrances?
- What has been done to provide for small group seating outdoors?
- Is eating outdoors encouraged? If so, sun and wind shelter may be indicated.
- What about the view?
- If traffic hazards and noise are to be minimized, the school should face a secondary street.
- Schoolman, spare that tree!
- Where are the power mower, power sweeper, and snow plough kept?
- What about trash barrels and outside drinking fountains?

Tomorrow's School

With *sputnik* in orbit and automation on the horizon, there is more support for public education today than ever before. The individual school, too, has taken on a more important role in the life of the community. With this growing public support and through the strong and imaginative leadership of the educator, the elementary school of tomorrow will become more and more the vital center and force of the neighborhood community. American educators have barely scratched the surface as yet and tomorrow may find that the unattainable has become the everyday by-word.

The Site and Its Climate

Walter McQuade

WITHIN the continental limits of the U.S.A., you can find most of the world's climates: subtropic, desert, temperate, steppe, alpine. Florida has the climate of Hongkong; Arizona, that of the Middle East; Oregon, that of Japan or England. The plains of Kansas are like the Russian steppes; Maine is like Sweden; western Colorado like Switzerland. Mississippi's climate resembles that of northern Italy, Tennessee's that of central France. With this multitude of geography in one country, the surprising thing about U.S. school buildings, like U.S. accents of speech, is not how much they differ, but how much they're actually alike.

Climates of this sort are all what the weathermen call *macro*-climates—i.e., large-scale climates applying to whole regions. But you will also find tremendous variations within a given macro-climate. Sometimes these variations are natural, as in the San Francisco area where a short drive takes you to the moors of Scotland, the rain forests of New Zealand, or the apricot groves of Israel. Sometimes the variations are man-made, as in the temperature differentials between the heart of a city and its surrounding countryside (the city is *always* hotter, winter and summer). You will even find quite different climates on different slopes of the same hill, as any farmer or orchardist can tell you. These small scale variations the climatologists call *micro*-climates.

You would think that American school buildings would reflect these vast variations. Oddly enough, they seldom do. Yet, when you select a site, not only the comfort and well-being of your children is involved but also the amount you will spend on heating or cooling, snowplowing or irrigation, grass or asphalt. This is the reason that your architect should know his climate, macro and micro. No climate is perfect but there are always ways to

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exploit its good points and correct or minimize its deficiencies.

It goes without saying that the school board must consider many factors besides climate in the selection of a site: size and location; soil conditions and topography; surroundings and accessibility; as well as availability of services (electricity, water, sewage lines, and fire engines). In many towns, schools are combined with parks; in new suburban developments, school sites are always community cores, and this should be recognized early in land planning. Always look a gift site in the mouth; more than once a generous benefactor has presented a school district with a piece of land that cost twice their site budget before it was made habitable for a building. Get an architect in on this early, on a flat fee basis, if necessary, even before you decide on the architectural firm you want to have design your school building.

Knowing Your Micro-Climate

But once you have narrowed the selection of sites down to several which are equally acceptable for the educational program, for access, for cost (eventual, developed cost, that is) and other criteria, analyze their micro-climates.

A school board in Helena, Montana, for example, has to accept the Montana climate, but the micro-climates of Helena offer a wide range of choice. By placing the school on the *south* slope of a hill instead of the north, you get it exposed to the winter sun and protected from the winter winds. The north slope may be only 1,000 feet away: yet for all practical comfort purposes you may have moved the school as much as 1,000 miles to the south! Spring will come earlier, winter later, and all the school days will be warmer. (You can easily prove this by checking the date of snow melt, flower bloom, etc., on each of the slopes of this same hill, even before you build.) In Arizona, on the other hand, where all the days are hot and all the nights cold (a typical desert phenomenon), a school located on a north or northeast slope will be as much cooler than a southwest slope as if it were hundreds of miles to the north, in Wyoming.

Of course, there may very well be no hills at all in your town. If not, you should try to employ architectural and landscaping devices to accomplish the same thing. (More about these later.) Even if other considerations force you into a climatically difficult site, professional imagination can usually overcome the worst deficiencies, for every piece of land has some inherent potentials which can be exploited by an ingenious designer or overlooked and lost by a poor one. In the last analysis, your site is merely the raw material for a fine plan, not its guarantee.

If your climate dictates shade and trees are missing (as in Oklahoma, Texas, or Kansas), you must decide whether to plant trees or erect shading devices. The mainstay of the science of the climatology is the difference in the sun's path from winter to summer, of course: in winter the sun travels low in the sky, and can peer under the overhangs designed to block it in summer, when it rides higher and hotter. If the site is exposed to cold winter winds, tree belts, walls, and fences can be placed to break their force. Or the bulky elements of a building (gymnasium, cafeteria, auditorium) might be so disposed as to protect classrooms and play areas from prevailing winds. If, contrariwise, your winters are warm, making shade and cross-ventilation more important, then your trees should be so placed as to stop the sun without stopping the breeze. Decisions like these require your finding the direction of prevailing winds during the school months (your local Weather Bureau will be glad

to help you) and orienting your building accordingly.

Climate and the Structure

Your local climate may also determine a number of other architectural features —roofs, for instance. If you are building in areas of heavy snowfall (northern New England, the Dakotas, the Rockies), your roofs should be designed for it. Either steeply pitched, to shed the snow; or flat and very strong, to hold it: snow is an excellent insulator. On the other hand, if you are building in Miami, New Orleans, or Galveston, your roofs will have a lot of rain water to shed. Roofs can also be "cool" or "hot," depending upon their very design. If your climate is hot and dry (San Antonio, San Diego, Tucson), you'll want a "cool" roof—white in color to reflect solar heat, with well-ventilated attics to carry off hot air before it heats up the classrooms. In hot, wet climates (Biloxi, Jacksonville) a "cool" roof might well be flat with a curb around the edge, to hold a shallow pool of rain water—water also is a good heat insulator and excellent protection for asphalt roofing. If your winters are long and cold, you'll want a "hot" roof—dark in color to absorb heat, snugly closed.

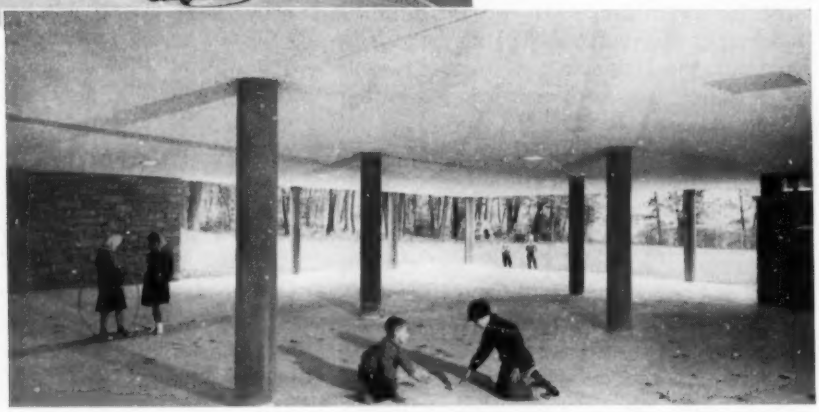
Your climate may also determine the character of the walls and windows, within reasonable limits. Their insulating characteristics should be adapted to local climatic conditions. In the Southwest, with its hot days and cold nights, heavy masonry (more than eight inches thick) is good because it is very slow to heat up and takes all night to cool off. (The Indians, of course, have made use of this principle for centuries with their *terra pise* and adobe walls.) But in most climates you'll need insulation of the conventional sort—mineral wools and aluminum foils or combinations of these materials.

In general, classroom walls are best oriented to have southerly exposure, provided they have horizontal overhang to block direct sunlight. (Their optimum orientation, because of the cooler forenoon temperatures, shifts from south toward east in different U.S. climate zones.) If classrooms are placed on both sides of a corridor, then the second-best orientation should be utilized for these rooms, which is, generally speaking, near north. The exceptions are in the cool, and possibly in the temperate zones, where longer cold periods make sun heat welcome, so east-west orientation of the classroom windows is preferable. In the hotter climates it is especially important that classrooms should have cross-ventilation and the orientation will depend not only on the sun, but on the prevailing direction of the winds.

Climate and the Landscape

In all decisions of orientation, the finished landscape in which your school is to be placed can also be made to work for you or against you. Configuration of the land, planting, paving, walls, and fences are your natural allies. Properly used, they can make your buildings cheaper to build and operate; more comfortable for students and staff; and better looking for all concerned. Properly used, they can reduce the amount you spend on heating, cooling, and ventilating; the quantity of acoustical and thermal insulation required; the number of lights, blinds, shades, etc. you have to buy and maintain. Improperly used, they can make excessive heating or cooling situations worse.

School programs vary across the country: site developments to implement them will, too, depending largely upon local weather. Take, for instance, the problem of playfields. Tennis, basket- and volley-ball courts can be used through-



Play facilities keyed to different climates

out the school year south of the Charleston-San Francisco line. In the North and in the Rockies, long winters, heavy snowfall, and extreme cold may reduce this to a few weeks in fall and spring. Undifferentiated play areas for younger children are mandatory everywhere, of course. Where winters are long and cold, they should be oriented for maximum exposure to sun and maximum protection from wind: generally speaking, this means open to east and south, protected from west and north. In warmer climates, orientation of the play areas is obviously less crucial.

But wherever you're building, parts of such play areas should be surfaced to minimize the mud problem. In the North, the paving might be black-top, since it absorbs sun heat and melts snow much faster than concrete. In the South, your problem would be rain: here masonry paving would be cooler (though probably more expensive) than black-top. In the Southwest, dust is sometimes more of a problem than mud: if the play areas are properly graded and tamped, dust can be held down by periodic spraying with one of several dust-laying chemicals. Anywhere south of the Savannah-Shreveport-Tucson line, play areas ought to have shade. In the Southwest, you can rely on trees, since your problem is mainly intense sunshine, but along the Gulf and Florida coasts, shading should be rainproof as well as sunproof. In these mild climates, also, corridors can often be of the open gallery type and—if made wide enough—they can easily double as protected play areas in periods of wet weather, thus providing year-round outdoor facilities.

In sizing up a site for drainage of storm water, keep the flash storm in mind. If the terrain can absorb a fall of two inches in a half hour, for example, it will have little trouble soaking up longer but slower rainfalls, nor will the runoff from thaws

create a real problem. Where the site is relatively (but not absolutely) flat with good moisture absorption capacity and not too much paved area, site drainage presents no problem. On the other hand, if the ground is uneven with rocks or stone near the surface, the site runoff will have to be dumped into catch basins, manholes, and runs of piping to some low spot on the grounds where it might be allowed to pond temporarily until it can percolate down into the soil. If this is impractical on your site, then dry wells must be used. Sandy soil is very good at soaking up water; clay is very bad.

Another thing to keep in mind when site-shopping is the probable character of the school to be built on the land, and this also has a generalized link to your area's climate.

In general, in the colder regions of the U.S., architects favor more compact building forms, with enclosed corridors and reduced exterior wall surfaces. As you move south and the weather becomes more temperate, buildings become more elongated, and there is freer use of forms. Then, in the hot-arid region, buildings go back to the block shapes, with cluster plans and shaded open walks. In the hot-humid regions, you will find, for good reason, many "finger" plans with open walks and emphasis on through-ventilation and shading devices such as overhangs and louvers.

Trees

Of all the elements in the landscape, trees are the most important. Even if your climate is hot and sunshiny, properly placed trees will stop the sun's rays before they overheat the classrooms. But an improperly placed tree in a cold climate could force the teacher to turn up the heat and turn on the lights when, actually, both heat and light are available, free, outside. Where you place your trees, in other words, *depends entirely upon where you live.* Baltimore, Maryland, and Sacramento, California, are in the same latitude. A hundred square feet of wall in either place will, on an average December day, receive 40,000 B.T.U. of heat from the sun. But in Baltimore the outside temperature may be 30 degrees, while in Sacramento it's 80 degrees.

Or another example: the cooling effect of wind is directly proportional to its velocity—that is, zero degree *still* air is no colder than 18 degree air in an 8 mph wind; still air at the freezing point (32 degrees F.) is no colder in effect than 50 degree air in an 8 mph wind. In North Dakota, protecting your school from the wind can therefore be the equivalent of raising the temperature 18 degrees, or moving the school hundreds of miles to the south. And trees, planted in thick "belts," make excellent windbreaks, diminishing velocities as much as 80 percent in their immediate lee. If you're building in a hot climate, you may be able to plant your trees so they'll actually help to funnel the breeze into the buildings.

If your site already has good trees on it, make sure that every possible one is saved. If your site is treeless, make sure there's a budget allowance for planting them. And plant the biggest trees you can afford. Small saplings are easy to transplant but have a hard time getting established except in climates with mild winters and heavy rainfall in summer, especially with young children climbing, swinging, and carving on them. With today's tree-moving techniques, almost any tree can be successfully, if expensively, transplanted and the big companies guarantee to replace the ones which die.

What *kind* of tree you plant depends upon *when* you want shade, and that, in turn, depends upon your climate. If the school is in the deep South, you have a magnificent choice of indigenous trees: for hot weather shade such deciduous

ones as sycamore, sweet gum, tulip poplar; for year-round shade, such evergreens as the live oak, magnolia grandiflora, swamp bay, and pine. With irrigation, most deciduous trees will grow in the Southwest, though the native willows and poplars (cottonwoods) are the hardiest and fastest growing. If you live in the Midwest or Plains states, the tree problem is more difficult, with bitterly cold winters. Deciduous shade is probably preferable: the maples, oaks, sycamores, and thornless Moraine locusts, with willows and cottonwoods again for the drier areas. In New England, the Rockies, and along the West Coast from San Francisco up to Seattle, the full range of native conifers is available; but care should be taken not to place them where they'll cut winter sun from classrooms or play areas. On the other hand, of course, the conifers are ideal for windbreaks and snow barriers.

Lawns

Lawns are the second major feature of any landscape design. Everybody admires their appearance and complains about their cost. And they are costly, both to install and to maintain. Yet the sad fact is that, for most parts of the country, there is no other practicable way to keep large areas under what the landscape architect calls "control." Paving is expensive, usually ugly, always hot, and sometimes dangerous. The so-called ground covers (pachysandra, ivy, myrtle, honeysuckle) are more expensive than grass and cannot survive schoolage traffic. So, no matter where you live, you'll probably end up with a large portion of your school grounds in grass. In the Southwest, you'll have to irrigate. In the Southeast, if you want an evergreen lawn, you'll have to sow twice a year (and sod slopes) since the evergreen perennials such as Kentucky Blue or the creeping bents can't survive the summer heat. Only southern Florida, in this area, with its coarse St. Augustine grass, has a true evergreen perennial lawn. In the North (Lincoln - Chicago - Pittsburgh - Boston), evergreen perennial lawns are possible—though of course they're under snow for several months in winter. Actually, the only ideal lawn country in the U.S.A. is the cool and rainy Northwest (Portland-Seattle-Vancouver).

Lawns, like all vegetation, make excellent air conditioners: in hot weather, temperatures immediately above them will run 20 degrees cooler than over a paved area immediately adjacent. They make excellent air filters, catching and holding airborne dust on thousands of blades. Like carpets indoors, they even make good acoustical absorbents. Thus, they are good investments for the entire community. Try not to skimp on their costs. Build them well, plant the grasses recommended locally, fertilize them properly—and you'll save money over the course of coming years.

Shrubs and Vines

The most common error in school ground landscaping is that shrubbery is handled on a residential scale. For example, shrubs are often used as "foundation planting" around the base of the buildings proper. There could scarcely be a worse way to use them. This practice, borrowed from residential work (even there it seldom really makes sense), raises all sorts of problems. Because of roof overhangs, they seldom get enough water, especially in winter. They take a beating from the kids and—if they survive that—soon grow so big as to interfere with window washing, painting, and caulking. There are, of course, plenty of good uses for massed shrubs. A thick planting of mixed shrubs along a busy highway will not only keep children from dashing across the traffic at unpoliced

points; it will also, to an astonishing degree, reduce the noise, dust, and fumes of that traffic. Massed shrubs can screen unsightly buildings, serve as snow fences and as pedestrian traffic barriers. But shrubs should be selected for hardiness (use local ones wherever possible), long life, and easy maintenance—avoid hedges which need continual clipping, for instance.

The same general considerations apply to vines. They make fine sun shades on arbors and trellises but few of them are hardy enough to survive the children. Clinging vines—ivy, ampelopsis, hydrangea, etc.—are handsome but, unless you have solid masonry walls which will never need painting, don't get them started on your buildings. Some of them will try to come through the walls.

Avoid annual or perennial flower beds. They're too small in scale to amount to anything, too fragile to survive the children, and very troublesome to keep up: you can maintain a couple of acres of lawn on fewer man-hours than a bed of annuals. The only exception to this rule would be the garden plots of the children themselves in some schools, or that rare community whose PTA will keep flower gardens in apple-pie order.

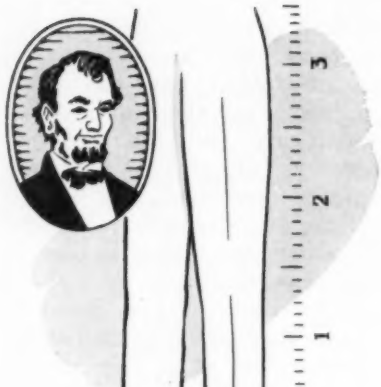
Layout of Walks and Paths

The "keep off the grass" signs which dot most public spaces, the pathetic little barricades at path intersections, the trodden-down shrubs at sharp corners are the marks not so much of perversity in children as of obtuseness in the people who designed them. For all pedestrian traffic, like water, automatically takes the line of least resistance. On a flat area it will take a diagonal short cut instead of a right-angle turn every time. On a steep slope it will usually work out a zigzag ascent or descent. School grounds would be a lot handsomer if designers recognized this fundamental truth. In fact, in new layouts there is an increasing tendency not to install permanent paved walkways until after the children have had a few months to tramp out their own paths. These are then paved, with the result that "traffic violations" are reduced and "keep off" signs are not necessary.

School plants are constantly increasing in size. Thus they are coming to play an increasingly important role in the appearance of the community as a whole. For this reason they should be landscaped to be as good to look at as they are for the school population to live in; and they should maintain their good looks around the year. This means twelve full months of maintenance, not just eight or nine. Moreover, a twenty-acre school plant reaches the dimensions of many a city park. You can't expect an old-fashioned janitor to handle this kind of job in his "spare" time. For this reason, all landscape materials should be selected for durability, for long life, and for low maintenance.

Landscaping Is Important

Landscaping today is expensive, and many school boards, thinking of it merely as an ornamental luxury, are likely to economize on it. That is why trees have been emphasized here as shade-giving, windbreaking devices; lawns as air conditioners; shrubs as acoustical insulators; the entire landscape plan as a "climate-conditioner" to produce more economic and more comfortable school plants. All this is literally true but, of course, there is a wonderful extra reward in this kind of science. A well-planted school yard is also beautiful, a stabilizing influence to its neighborhood and the community it serves. In congested neighborhoods, it may even be the only open area for many blocks around; it deserves special attention.



How Big Is a Good School?

Frank W. Hubbard

WHEN confronted by the question in the title, I could not help thinking of Lincoln's answer to another question, "How long should a man's legs be?" You remember, he thought that one's legs should be long enough to reach to the ground. Obviously, then, a satisfactory size for an elementary school would be "big enough."

Trying to translate "big enough" into concrete terms has driven many principals, superintendents, and school board members to the brink of distraction. Probably none of them will get a final answer from this article. We seem to be faced with an issue comparable to the one discussed by philosophers in the Middle Ages when they debated, "How many angels can dance on the point of a needle?" That question was not settled to the satisfaction of anyone; this article makes no guarantees that "desirable bigness" will be resolved in the next 3,000 words. At any rate, you have been warned.

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Put It There!

Somehow I have a hunch that the size of the typical elementary school has been settled in much the same fashion as the site of the U. S. Treasury building in Washington, D. C. The traditional story is that Andrew Jackson, irritated more than normal about the long and tedious debate over the building's location, finally said, "Put it there!" In this case, "there" meant in the middle of Pennsylvania Avenue just east of the White House. If the Treasury building had been placed at some other location, Pennsylvania Avenue could have ambled gracefully up to the eastern edge of the White House grounds and the landscaping thereabouts might have been more attractive than it is today. Furthermore, the thousands who have marched in parades on Pennsylvania Avenue would have walked perhaps 100 steps fewer and that might have been important to their tired feet.

School size has often been settled by impatience and fatigue. After prolonged debate, those in authority may have said, "Make it for 500. That will cover our present needs and house a large enrollment during the next few years." And

others, through sheer weariness, agreed to just "put it there."

Make a Survey?

The rule of thumb procedure just described may not be typical of current practice today. At any rate, a few brave souls have sought to develop measures of population growth and to estimate school size in terms of community needs. Often these surveys, combined with community planning, have taken into account such factors as the cultural interests of the residents of the area, the traffic hazards, the libraries, and other aspects and agencies of community life. These efforts have been worthwhile in planning for new schools.

Despite the availability of the techniques for community planning and population estimating, neither has had much chance to bear upon schoolhouse planning. Those who stake out new communities have long followed the practice of saying, "Oh, yes, we will have schools in the new area," but then they laid out the streets, sold the lots, and told the board of education little about their future activities. Much energy of school officials has gone into the business of catching up with the dreams and the mistakes of real estate promoters.

Certainly, the community survey idea and the methods of estimating population trends of a community have an important place in determining the size of elementary schools. But—with all the data—how does one decide that School X is to be a certain size?

Then There Are Rural Schools

For many decades, our nation has been served, and well served, by many one-teacher schools. As late as 1952, the U. S. Office of Education reported that there were 50,000 such schools with a total enrollment of 800,000 (on the average of about 16 pupils each).[1]

The one-teacher school served a useful purpose. It was on the front line moving along with the westward movement of population. Even after the frontier was gone, the one-teacher school offered opportunity to many in the sparsely settled areas. When new communities sprouted nearby, it was relatively simple to build other one-teacher schools after the walls of the first one began to bulge. If a crossroads community became a town or an important county seat, it often built a larger school, perhaps one for all twelve grades.

Years ago, however, those interested in rural education became disturbed by the smallness of the rural schools. The ebb and flow of population, changing patterns of farm work, the growth of cities, and other factors meant that rural schools were one year rich in children and, a few years later, hardly able to stay open. This almost unpredictable change was disruptive to housing and to instruction. Furthermore, it was costly. The concern led to the movement for the consolidation of school districts into larger areas with larger school units. The result, in general, was greater stability in school enrollments as well as better programs of education.

As changes continued, such as the improvement of the road system and the development of safer and larger school buses, the consolidation movement enlarged its concepts of what constituted an "adequate size" for school districts. Although recognizing the necessity of improving teachers' qualifications and offering more quality in instruction, the major factor in these "larger and ever larger" districts has been to strengthen the financial situation. Larger schools cost less per pupil and larger districts spread the tax load over a larger population and expand revenue-producing tax resources.

One wonders whether in the consolidation movement enough attention has been paid to what happens to the individual child and to the fate of the especially competent teachers in small schools. Hundreds of adults have testified to the significant part that teachers in individual one-room schools played in their lives. If as children these nostalgic adults had been placed in much larger schools, they might have been "just more children" and each outstanding teacher "just another teacher." Something of the magic of smallness might have been lost.

We do not argue against larger school districts and larger enrollments in rural schools. Certainly, the forward steps in better educational opportunity for rural children have brought gains both for the children and for the nation. We're just wondering, however, whether the unique quality of "smallness" has been lost sometimes from rural education and not adequately replaced by "bigness."

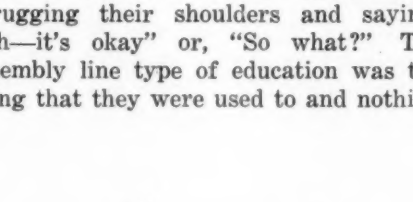
Lost in the Shuffle?

One of the most important questions about school size has to do with what happens to the individual child. How important is his health and happiness? What social development can he get from his small group that can never be found in big groups? How important are these experiences and learnings as compared with such matters as per pupil cost or economy in school construction?

Let's take a look at a large elementary school such as we can readily find in most metropolitan centers. There it stands with its 1,000-plus pupils and its factory-like exterior. It is a well-managed school. The pupils fit into the rooms, they know how to behave by not running in the halls, and they march promptly to the tap of the bell. The classroom teachers have many instructional aids, the classes are large by modern standards but not overcrowded, and the per pupil costs are reasonable. Occasionally, the pupils have a fleeting glimpse of the principal. What more could anyone want?

Several years ago, I visited such a school in a large city. Clearly, it was well organized and well managed. The teachers knew their business, the principal had a master's degree, the school hummed with activity—it was a safe and efficient school in terms of commonly recognized standards.

In this school, I saw no obviously eager children; neither did I see any who were extremely depressed or unhappy. Maybe they just looked and acted like children who lived under metropolitan conditions. Those I talked to often answered by shrugging their shoulders and saying, "Oh—it's okay" or, "So what?" The assembly line type of education was the thing that they were used to and nothing



could be done about my sentimental ideas of a larger playground, the presence of trees and flowers, and the possibility of seeing the sky without cricking one's neck.

That others have understood the hazards of big, big schools is shown by the efforts in metropolitan centers to bolster up, or even to restore, some of the activities of a "neighborhood" school.[2]

With this thought in mind, the designers of new buildings provided facilities which would encourage community interests and activities. Even in the older sections of these cities, the development of community grouping and community thinking have been encouraged. Perhaps these efforts have failed to take root. Of importance, however, has been the realization that increasing bigness brought certain losses in group relationships and that something should be done about it.

Whether or not "it" can be measured, something happens when an elementary school becomes "too big." Contacts with individual children become difficult, almost impossible. The sheer number of pupils necessarily makes for mass methods in management and the overtone of this condition tends to easily slip over into instruction and into all human relationships. I know of no statistics or research to prove the point, but most teachers are aware that bigness often increases tensions and impedes their efforts to advance the purposes of a modern school program.

How Small Is Too Small?

If there are weaknesses in being too big, we must admit that there are also weaknesses in being too small. The one-teacher school, admirable in the hands of an unusual teacher, could be *too small* in the hands of an untrained teacher. The ups and downs in enrollments not only disrupted continuity in instruction but also disrupted the friendships and social relationships so necessary for well-rounded child development. Lack of school revenues deprived many pupils of instructional experiences which, in a larger school, would have been mere trifles in the school budget.

The importance of avoiding too much smallness has for many years concerned the NEA Department of Rural Education. In its publication *Your School District,* the Department recommends that no elementary school should be smaller than 175 pupils and 7 full-time teachers.[3] An even more desirable minimum, states the report, would be a school of 300 pupils and 12 teachers. At the same time, the Department recognizes the past contribution of the small school and its continued usefulness where population is sparse and transportation of children to school unusually difficult.

There may be many rural educators who would like to see rural schools of 500 or even 1,000 pupils. Their dreams are blocked by a lack of buses, opposition of public opinion, and a dozen other reasons. Public opposition often comes from parents who insist that family problems, safety factors, and health matters must be considered in addition to transportation and financial efficiencies. Is it possible that these human factors have not always been fully considered when the size of the school has been determined? Even though a district is enlarged in terms of tax resources and total population, is it still possible for the size of the individual school unit to be closely related to home life, to rural employment, to distance in relation to time, and to the human relationships considered important by both children and parents?

The Search Continues

From the beginning of time, man has sought the "optimum" in everything. Why not with regard to school size? When the optimum has been assumed as the same as the average, tabulations of existing school sizes have been made. These results usually give very little guidance since they are averages of widely varying conditions.

In 1948, the Department of Elementary School Principals, NEA, issued its second major study of the status of the ele-

mentary school principalship.[4] The Editorial Committee, after considering what principals did and said, recommended that an elementary school should enroll approximately 800 pupils. The Committee was of the opinion that schools of less than 400 or more than 1,000 pupils did not provide "the optimum combination of good education, economy, and efficiency." At any rate, this Committee viewed "good education" as a major factor along with economy and efficiency.

In 1949, the NEA Research Division asked school systems to report on trends in school organization.[5] One question had to do with the "best" size of school. Eighty percent of the sizes, chosen by respondents in cities of 100,000 and more population, were between 500 and 800. The total range of school size in the replies was from 300 to 1,000. It is likely that most of the superintendents and directors of research replying were reflecting their own experiences and common practices.

Three well-known school consultants issued a book in 1953 in which they suggested that schools might well be about 350 in pupil enrollment with 14 teachers for the span from kindergarten through grade six.[6] They thought that a school of this size would avoid many of the problems of smaller and larger schools and that it was large enough to justify and to make full use of a modern school plan. Furthermore, they thought no principal could know and work effectively with more than 15 classroom teachers.

In 1954, the Department of Elementary School Principals, NEA, adopted a resolution on school size. This resolution maintained that no elementary school should be larger than 500 pupils. In effect, this resolution "officially" over-ruled the recommendations of the Yearbook Committee of 1948.

Also in 1954, the *Nation's Schools* reported that a group of responding superintendents agreed that no school should be smaller than 250 pupils.[7] Almost half of the replies favored schools of 350 to 500 enrollment. Apparently, superintendents and elementary school principals are almost in agreement on the "optimum" school size.

The same year, a college professor wrestled with various angles of "optimum size" and decided that schools of 1,000 to 2,000 were undesirable in terms of satisfactory group relationships.[8] He questioned that any school should be more than 300 to 400 pupils. With increasing enrollment, this author believed, the individual child lost his identity. Large schools seemed to cause tensions and tended to increase the neglect of the individual pupil.

That's That!

Yes, that *is* that—and not much at that. In the past, school size has been decided largely in terms of expediency. When a decision had to be made, someone made it, with or without facts. Later, studies of population trends led to prediction of probable school growth and from these data were made estimates of "approximately the right size" for the individual school unit. Schools have been constructed in terms of these estimates. The result often has been to provide "good" individual schools from the angles of construction costs, operating costs, housing of present enrollments, use of school plant, and the quality of the educational program. At any rate, everything was fine until population growth overwhelmed the carefully designed facilities and destroyed the well-thought plans for quality instruction.

In many communities, experience has shown that the concept of an "optimum school size" has little chance for survival under the impact of population growth and other community conditions.

Provide Optimum Conditions

We are wasting our time in trying to find an infallible single figure expressing the optimum size. We might better seek to maintain schools within a range between 400 and 800 and then direct our fighting efforts toward providing "the optimum conditions" within each school, regardless of its exact enrollment. This, perhaps, will go far toward providing a good educational program.

Common sense and experience tell us, for example:

- The typical elementary school class should be about 25 pupils (possibly a range of 20 to 30).
- The total number of pupils in the school must be large enough for grouping pupils according to their maturity, experiences, interests, and abilities, so as to facilitate good instructional practices.
- The number of pupils in each class should be large enough to give every child a variety of small group experiences with his peers.
- Building facilities must be clean, safe, complete, and readily adaptable to educational plans.
- Devices, equipment, and instructional supplies must be present in wide variety and obtainable with a minimum waste of the teacher's time.
- The school must be staffed with clerks, custodians, and other supplementary employees to protect professional employees from heavy loads or routine tasks.
- The school's professional staff should have available the immediate help of a wide range of specialists in instruction, psychology, health, welfare, and other fields closely related to the goals of modern education.
- The classroom teachers must be carefully selected in terms of their preparation, interests, and ability to carry out their assignments and helped through functional in-service training and personnel programs to keep up with new methods and ideas in their field.
- Staff and policy must provide the means whereby close and friendly relationships can be maintained with the home and with all other community resources which can enrich the program.
- The principal must be chosen in terms of his preparation, experience, and professional vision; he must be given opportunities to keep up with modern trends and must be encouraged and supported in following new and better instructional procedures.

These items are not new. The trouble is that they get more "lip service" than actual use. For too many years, classroom teachers and principals, through improvising and by sacrifice of professional skills, have sought to keep up appearances despite overwhelming numbers of pupils, lack of instructional aids, lack of clerical help, unnecessary community demands, and a host of other pressures. And in the midst of all this, we have not lived up to our knowledge of what is quality education.

It is necessary to insist that the total school enrollment should be reasonable. It is far more important to remind ourselves of the factors that make for the best possible learning conditions for each child and to insist that additional resources be added as enrollment increases. The eyes of both the public and the profession should be focused less on total enrollment and more upon the careful adjustment of the front line—the classroom—in terms of the purposes of modern education and the findings of psychological and educational research.

A classroom should be inviting. What a child sees from the window is part of learning, too. There is no "confined" feeling here where the out-of-doors comes into the classroom.

The Physical Environment

Lawrence B. Perkins

NO parent would consider sealing the windows and removing all colors from a child's room. But this is precisely what we do in many of our schools. We stay clear of restaurants with tomb-like interiors, dirty walls, and peeling ceilings. Yet millions of American children are attending schools with a physical environment no better than Hollywood's conception of a prison.

Fortunately, most schools being built today do not resemble this frightening description. The picture of the child looking forward to his first day of school with fear in his heart is fast disappearing. In fact, the first day of school is an event eagerly looked forward to by a growing

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percentage of our children. The unfortunate thing is that this percentage is still discouragingly low.

Why Attractive Schools?

When a community decides to build a school, there is usually a standard list of clichés the school administrators and members of the school board can count on hearing. The list usually includes at least one of the following remarks:

"What are we building here, anyway, a palace?"

"I turned out all right and I went to school in a wooden building that didn't even have indoor plumbing."

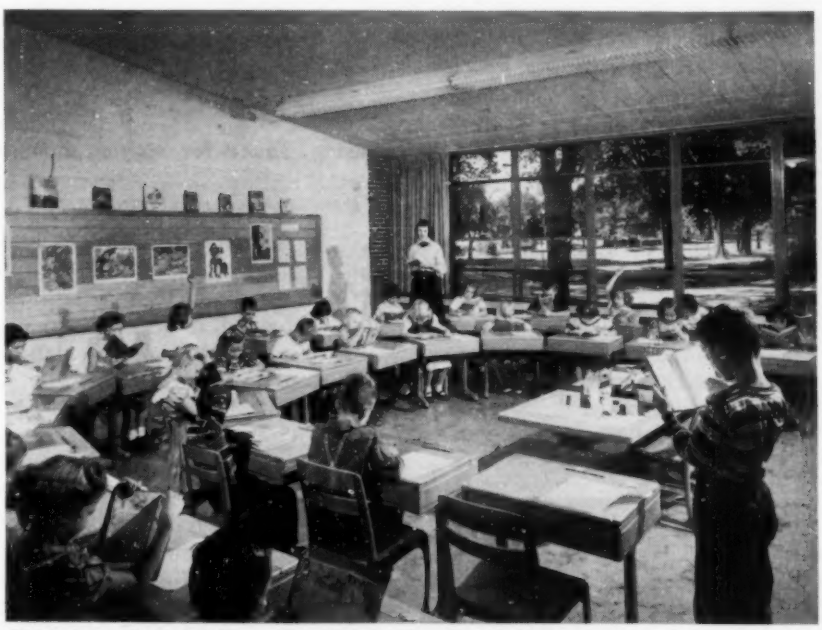
"We give our kids too much nowadays."

"What's wrong with the old school? Why don't we remodel it?"

The list could be expanded and added to by any school board member or school administrator who has ever been involved in a building program. A school architect with experience in designing more than two schools has in all likelihood heard them all.

Why do citizens have this attitude? What makes a man who would not think of having a pot-bellied stove in his living room think it is perfectly all right for his child's school to be as out-dated as a Model T Ford? There is really no answer to this question. Basically, it is probably a feeling that there is a danger of "giving a child too much" today.

Actually, a well-designed, attractive school has just the opposite effect. Of course, we do not advocate that a school must be a palace. Far from it. But a modern school should be attractive. What some call frills and "unnecessary extras" are not really frills and extras at all. They are simply an attempt to use the materials and building methods available



Textures of building materials, colors, flexibility of arrangement—all of these help to make a classroom which teachers and children can enjoy.

today to give a community a school that will help the teacher do a better job and help the child want to learn what the teacher has to teach.

The School Building Revolution

This philosophy of the physical environment as part of the educational program has been evolving since the turn of the century. It is just now coming of age. The influence of forward-looking communities who were brave enough to believe that the school no longer need look like a Greek temple has been felt in all sections of the country. Reports from educators, parents, and children themselves have shown that this school building revolution is one of the most important things to happen in the field of education since the first man said, "I want to learn."

The evolution in our concept of what a school should look like has changed the appearance of many schools from the outside. But we are still in the beginning stages of really deciding how to use the enclosed and covered space. It's amazing how many new schools still cling to the idea that a classroom should regiment the pupils with rows and rows of carefully arranged desks.

> The job of the school building has changed, is still changing, growing, diversifying . . . The [school] plant has several special functions: (1) It should provide facilities needed by the entire community — meeting places, facilities for luncheons and dinners, laboratories and shops where people can make and repair things, library materials, audio-visual facilities, recreational facilities, demonstration plots and laboratories, etc. (2) It should provide facilities particularly planned and designed for the full-time use of a particular age-segment of the community; i.e., for very young children or a nursery school; for children of 6-12 or an elementary school; for children of early adolescence or a junior high school, etc. (3) It should provide facilities for the types and kinds of activities for the instructional program which will be carried on; i.e., the teaching of reading, the teaching of music, the teaching of games, the teaching of how to raise poultry, etc. (4) It should provide facilities for the services which the community needs from its schools; i.e., physical examination facilities, lunchroom facilities, recreational facilities for children, group meeting place facilities, etc. (5) All its facilities should add to physical comfort and well-being; i.e., through proper lighting, control of sound, body temperatures, ventilation, etc. (6) It should add to emotional stability and growth by being esthetically comfortable. Beauty derives from order and harmony and balance of parts within a whole.[1]

That sounds like a big order, doesn't it? Fortunately, for school administrators, there are materials available to them and their architects to make certain that the school *and* the community get the space needed.

Space for Moving Around

The first problem is, "How much space is needed?" The formal fixed seat-and-desk arrangement could theoretically accommodate one pupil in every 10 square feet. But that is a far cry from the minimum space requirements for today's educational program.

To have the freedom necessary for all the flexibility needed with movable furniture groupings, at least 25 square feet per pupil (and desirably more) should be provided. Add to this the fact that kids don't stay at their desks all day. They move around. In the lower grades, they build a house. They may produce a play. In fact, there is really no limit to the activities that may be accomplished in any one

day. With this in mind, 35 square feet per pupil—not including toilets and workshops adjoining the classroom—is really the desirable standard.

Red—A Favorite Color

Just a little work with a young child of five or six will quickly demonstrate that the primary colors are the most attractive to him. A kindergarten teacher who wants to make a big hit with her class will often wear a bright red or green dress for the first day of school. Later, with a more conservative dress, she will use bright accents of the primary colors in her shoes or jewelry.

This knowledge has led many schools to make the mistake of splashing primary colors over all the walls and furniture. This may stimulate the children, but the teacher will soon be ready for a grey padded cell. The same theory that leads the teacher to introduce color in accents of jewelry should guide the selection of wall colors for the lower grades. Colors can be used, yes, but why not introduce them as accents or in a mural or wall decoration that will also stimulate the child's imagination? The child's desire for color will be satisfied in this way while at the same time he is introduced to the wonderful world of art.

> The recipe for a pleasing classroom atmosphere, one that stimulates and encourages learning, is at best, nebulous. At least two additional ingredients, however, can be pinpointed: the fresh, ever-changing outdoor scene, and bright color. Make the outdoors part of the classroom and paint (small parts of) the walls, ceilings, or fixtures in vivid primary colors and you have done much to make the classroom a friendly, *workable* place.[2]

Too often, this philosophy of a colorful classroom is limited to the kindergarten and lower-grade rooms. The use of attractive colors and natural environments to enliven the learning process should be used in the higher grades, too.

Douglas G. Grafflin, District Principal, Chappaqua Public Schools, New York, wrote on the completion of a new high school: "How is the plant working? It is our present belief that everything we had envisioned has come to pass, plus some dividends we had not expected. Almost all of the teachers are using the study alcoves effectively. The spread-out radial plan is definitely providing a relaxed atmosphere at the time of the passing of the classes. The library concept is producing the results we had hoped for. In addition, the general atmosphere of the school has led to better discipline and to more careful attention by the children to their appearance (more neckties and jackets on our boys, for instance)."

Lights Set the Mood

Attractive interiors are not enough. The child (and the teacher) must also be able to see and hear to make the school operate at top efficiency.

Lighting can make the classroom come alive. But it must be treated as something more than so many foot-candles, evenly distributed. Classroom lighting is more art than science. The first job of lighting, of course, is to provide proper seeing conditions, but this is not the only goal. Lighting can also contribute to the mood for learning, to the psychological well-being of the student. It should be a stimulant. Bland, coldly uniform, "scientifically planned" lighting usually has the opposite effect—it bores and depresses. A clue to the best answer can be found in the natural lighting of the fields and forests where the eye evolved. There, the lighting changes; it is a shifting interplay of opposites—warm and cool, light and shadow, soft and hard, level light and accent light. Similar lighting in the classroom will give

Light enters this room from two sides, providing steady, glareless light. Vents permit cross ventilation.

the interest and stimulation that make the classroom a place to enjoy, an agreeable place to work and learn. And, it should be added, this natural lighting is in no way an obstacle to the use of audio-visual teaching equipment so long as there are adequate window shades or draperies provided.

There are many ways to get natural light into the classroom. A window, of course, is the simplest. Today, there is no limit to how large the window can be. Today's design permits borrowing natural light from a hallway; the use of ceiling domes; and provision of high glass areas between classrooms. ". . . the crucial part of the lighting process, that of balancing brightness both inside and *outside* the classroom, remains difficult; . . . it cannot be solved just by buying foot-candles. It needs care and study." [3]

Fortunately, the architect can be relied upon to make recommendations which will be right for the particular building. Hence, school board members do not have to be lighting experts.

Quiet, Please!

The problem of noise is a real one in most of our schools today.

If you ask almost any elementary school teacher what her biggest struggle is in the classroom, during any season of the year, she'll probably tell you control of the acoustical environment. She surely won't use those words, however, but will put it more personally—keeping the kids quiet and attentive. 'They get worse every year . . . I don't know what their homes can be like,' says Miss Rimstock, with a sigh.

What Miss Rimstock may not realize is that her struggle is not just with the kids, but with the classroom. Classrooms may be noisy, no matter who is in them, simply because of the way they are constructed and finished. Some of the handsomest new schools we inspected across the U. S. were surprisingly noisy. This is perhaps the most common fault in new schools.[4]

Today, with the activities we require our schools to accommodate, the question of noise is greater than ever before. Just think of the things that may be going on in a school at one time. While the basketball team is practicing in the gym, 76 trombones may be blasting away in the band room. In the kindergarten, the rhythm band is going full steam while the ladies of the PTA are having a tea in the cafeteria. The noisy, disturbing elements (such as traffic in the halls) that have always existed still exist in a louder and more intensive form. What once could be

Lighting and acoustical ceiling are combined in this library to make it a cheerful, quiet place to learn.

corrected by formal discipline must now fail or call acoustical science to its aid. Reduction of noise is a justifiable objective. It is far more important to provide for good hearing at all times and in all parts of the plant.

Today, there is really no excuse for an acoustical problem. Available to the architect is a storehouse of knowledge and materials to solve any situation. Acoustical plasters, ceiling tiles (both decorative and practical), and other materials, used properly, can make any room quiet, while at the same time permitting the proper sound levels in all areas of the room. Even without standard acoustical treatment, a classroom can be relatively quiet by employing architectural features such as slanting ceilings and exposed beams to cup up the sound patterns.

It is amazing, with all the materials and know-how available, that many schools are still being built or remodeled with definite acoustical problems. Fortunately, all is not lost even if there is such a problem. With a little study, there is hardly a room that cannot be corrected when a problem of acoustics exists. Even the best architectural firms have been surprised to find that one of their buildings needs acoustical attention after it is put into use. Fortunately, few buildings are acoustically hopeless.

Near Windows: Wear Sweaters

In the depths of every school building is a mysterious mass of equipment seldom seen by anyone except the janitor, custodian, or engineer. Often, it does nothing but supply heat to the building. In some schools, there is additional equipment to assure the proper flow of air and, in still other newer buildings, the equipment completely air conditions.

> The most casual study will show that school heating and ventilating is unlike any other heating and ventilating. The buildings are occupied for only three quarters of the year, the occupants are divided into two groups of widely differing metabolism, and for the greater part of even the coldest day, there is more need for cooling than heating. There are many more of these little anomalies which, added to the usual strong emotions and weak budget attendant on school matters, make heating and ventilating design for schools the challenge that it is." [5]

How much should a school administrator know about the equipment that controls the school heating and ventilating? He obviously cannot be an expert on the subject. Even the nation's top school architectural firms employ experts to work out the complex problems of heating and ventilating. The administrator should be

more concerned that the efficiency of his teaching staff isn't suffering because of inadequate heating and ventilating equipment.

The first consideration is fuel. It is safe to assume that no Texas school with natural gas for the asking will heat its building with Pennsylvania coal. The factors governing this decision go far beyond mere choice of fuel. Gas, oil, coal, electricity, and perhaps soon uranium are only part of the problem. After you have generated the heat, you have to send it somewhere and you will do this by air, by water, by steam, or by wire. Or you will pump it out of the ground by reverse cycle methods. Electricity as a fuel is still too expensive for most school districts to consider.

Comfort and health are the primary ends and the extent that heating can contribute to them will have a bearing on the choice of system. Economy, of itself, will not begin to give a safe measure anymore than it does with lighting. Hot spots of great heat intensity may be most efficient in a dollar sense, but they do not provide comfort and are therefore unusually wasteful.

This is a big country. Every situation varies in place and, equally important, in time. The market for one heating method and its availability may be one thing one year and another thing another year. The most we can counsel is to keep an open mind and employ a good engineer.

> During most of the classtime, the heating problem is a negative one; heat must be removed. The job normally must be accomplished by the ventilating system which, many times, consists of an open window and a corridor ventilator or exhaust fan. This traditional system, though it actually was fairly effective in yesterday's high ceiling rooms, nevertheless becomes inadequate in today's buildings with fewer cubic feet given to each pupil. The next step up the line in effectiveness, to unit ventilators, is a big one. These ventilators are effective in all types of weather (windows must be closed on windy, rainy days when ventilating is most needed to dry wet coats for instance) and, while they seem expensive in that most of the system cost per room is paid to one manufacturer, the undivided responsibility and single-packaged purchasing make them quite attractive in the right circumstances.
>
> The potentially most effective ventilator is a central system where outlets can be effectively placed and the system tailor-made for the space. It must be carefully designed and detailed as with all duct systems and if proper provision in duct size and supply grill placement is made, such a system can be converted to air conditioning . . . Large rooms, assembly halls, and gymnasiums, however, must use some form of central system.[6]

Designed for Learning

We have been talking here about the environment—the space, with the many things that control whether that space is a workable place or not: light, sound, color, temperature. It has always been this author's philosophy that a school building should invite the child to come in. I also believe that, as far as the physical environment is concerned, he should be glad he entered once he's inside.

There is a great danger of making this whole business of planning a school sound so technical that it frightens off school boards and administrators. That is why there are architects and engineers in the world. They offer the school board the use of their knowledge of the subject so the board can concentrate on seeing that the community gets a school designed for learning—a building designed so that the children who will attend it will want to learn. That is the true test of a good school.

CLASSROOMS plus

Hollis A. Moore Jack C. Elrod
Warren W. Green
Glenn Kidd Nell Murdaugh
Elizabeth Stephens

NOT all elementary school children in this country will have new school buildings and new classrooms next year, nor the next year, nor even the next. A number of them, however, will be moving into new physical surroundings next fall and, presumably, each year thereafter in the foreseeable future if we interpret the signs of the times correctly.

Each of these classrooms will be a physical expression of an educational philosophy; a not-so-silent monument attesting most authoritatively and convincingly to the true educational convictions, desires, hopes, and efforts of its authors. Thus, in a real sense and to a very appreciable degree, the type and quality of elementary education which will be provided in each of these classrooms next year has actually already been determined.

The community and the professionally trained educator must bear the joint responsibility for making each physical facility the best possible learning place for every boy and girl. In spite of this fact, however, in many instances comparable amounts of money will have purchased comparable amounts of space, but the same healthy, happy efficient learning environment will not result. Sometimes educators may not have exhibited the proper leadership. In other instances, the physical facilities may be grossly inadequate as a place for learning because the community was unwilling to bear the financial cost of a first-rate school building or, perhaps, because of the mistaken belief that environment or physical facility has very little to do with the quality and quantity of learning.

When planning a new school building, it is much easier and infinitely more intelligent to look at the school program and build the facilities to meet its needs than it is to attempt to adjust or fit the program to the requirements of some preselected, fixed building. It is probably here, in the development of the educational specifications, that more work and planning needs to be done than in any other phase of schoolhouse construction. Just as life is much more than food, shelter, and clothing, so is education more than skills; and a school building more than four walls, a floor, and a ceiling.

Workshop for Learning

An elementary school is indeed a workshop—a place where children live and learn. They go there to work each day even as their parents go to their own places of business. The school, therefore,

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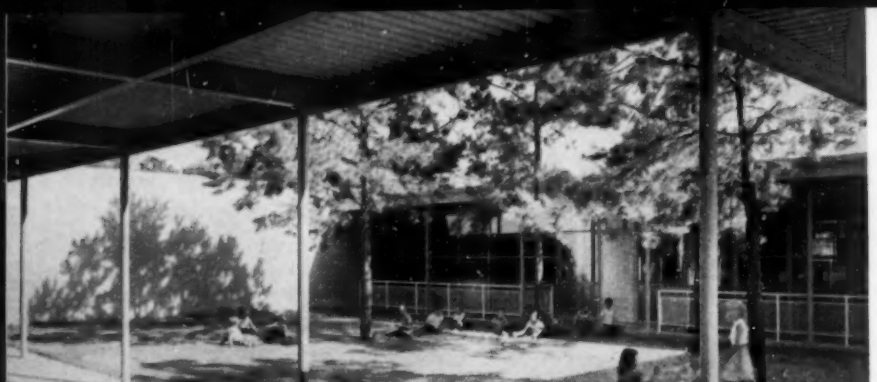


This shaded play court is used for b o t h enjoyment and learning

should be a place where each child's work —his learning and development—is unlimited except by his own capacity.

It should be a place where each child is treated as an individual. The recognition of the importance of the individual is basically responsible for the greatness of our public school system and our country itself. American education has accepted the tremendous challenge of educating the masses, but to do it on an individualized, personalized basis. Elementary school classrooms should promote this individual approach and feeling of personalization rather than making the child feel that he is a rather unimportant and insignificant part of an enormous mass.

Although much progress has been made in grouping children for instruction, apparently much more needs to be done in order to meet the needs of all children. School buildings, to a large extent, determine how well this is accomplished.

An adequate building contains spaces where small groups of children may work. There should also be spaces which will accommodate larger groups, even larger than one would normally expect to find in a classroom. Likewise, it is desirable and practical that some things be taught individually to children.

Internal student traffic can become a disturbingly serious problem in and around a building unless proper planning has gone into the design and layout of the plant. Accessibility of the playground, cafeteria, offices, and other plant units and facilities should receive major consideration. Students cannot be expected to remain rooted to one spot throughout the day. That expectation might find its fulfillment in the occupants of a museum or a garden, but elementary school children are neither noiseless and immobile nor vegetables. Thus, adequate provisions for the proper handling of internal traffic are a necessity.

The school plant should be a place where students can live and learn in safety and comfort. This does not call for a pretentious and luxurious building with correspondingly elaborate interiors, furniture, fixtures, and equipment. Neither does it mean a drab, depressing structure and accoutrements which create a cold and uninviting environment. The building should be a sensible compromise between these extremes—inviting, comfortable, efficient,

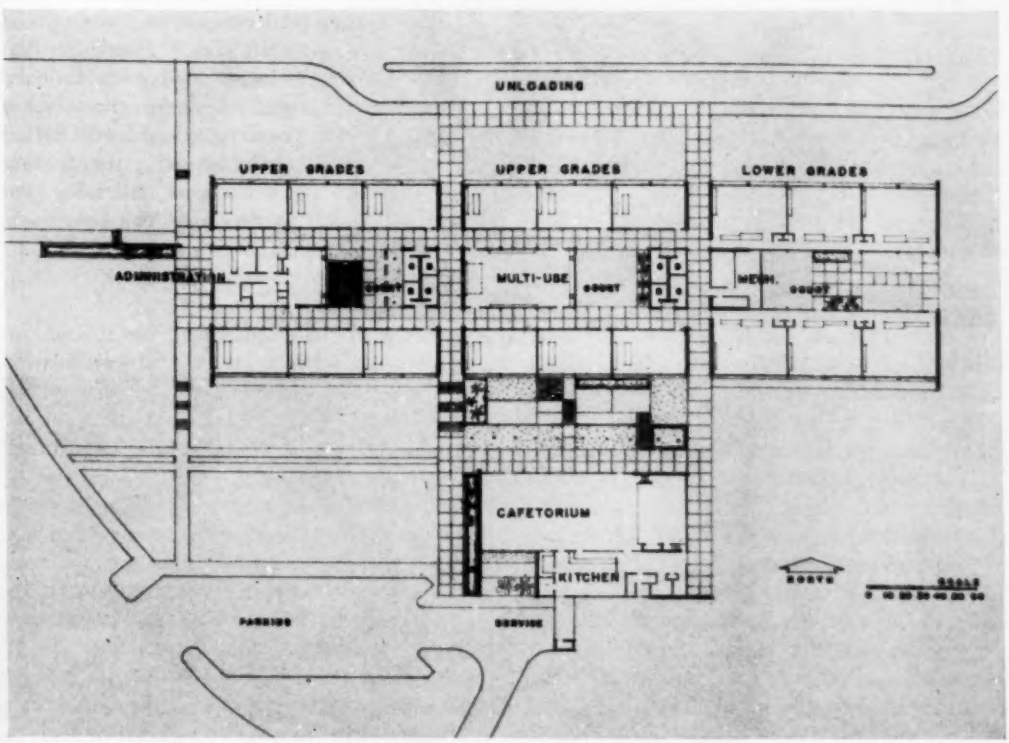
safe, and a source of justifiable pride to the community. Obviously, this is easier said than done; but it can be and is being accomplished.

The Classroom

During the school year, elementary children spend about one-half of their waking hours in school with upward of 85 percent of that time in the classroom. The classroom, therefore, should be cheerful, attractive, and comfortable.

A well-designed classroom is no accident! It is carefully planned to fit the children and the educational program it is to serve. Good classroom design is based upon an understanding of the school philosophy, the school program, and activities typical of real learning situations. It should be organized and planned as a laboratory for learning so as to better meet the needs of all children. An interesting classroom arouses the child's curiosity and starts him on a search for new understanding. It includes furniture of the proper size, in a flexible environment, that can be arranged for a better working relationship among children. It has centers of learning designed to take care of many and varied interests, such as reading, science, art, arithmetic, and music.

It appears to be generally accepted that an elementary school program is best car-



Floor plan showing layout of units and provisions for both external and internal traffic
Bruce Russell, and Associates, Architects, Tyler, Texas

A well-designed classroom fits children and their activities. Flexible furniture, ample chalkboard and bulletin boards, a variety of open and closed shelving—all contribute to a good learning environment for children.

ried out in what is called a self-contained classroom; that is, the basic teachings are carried on with a group of children by one teacher. Under this arrangement, the classroom becomes the most important place to and for the child.

The other areas, which might be called the "plus" elements, are intended to supplement the classroom and are important to the extent that they add to or facilitate the learning experience in the self-contained classroom. The classroom is the core of the school. The other auxiliary facilities are provided because of their desirable and valuable effects on the total learning environment surrounding the child.

Classroom space must be adequate. Although size will vary, most authorities agree that from thirty to forty square feet of floor space per student should be provided.

There should be ample glass, not only to admit an abundance of natural light to all parts of the classroom, but also to permit children to see outside. Children can and do learn a tremendous amount from their surroundings, and the classroom should be designed to take maximum advantage of this fact.

Too much glass, however, seems to result in additional problems, such as excessive glare and external distractions. Also, there is the complaint that large expanses of glass materially reduce the amount of usable teaching wall area as well as storage and display space. In addition, it has been suggested that a "fish-bowl" classroom tends to create a rather cold atmosphere, preventing or hindering the development of a relaxed, home-like environment.

There should be ample space within the classroom for children to hang their wraps and store their supplies. Clothing should be placed in individual compartments which are either open or well-ventilated for sanitation purposes. Individual storage space for students' supplies should be provided, preferably either above or below the clothing compartment.

Provision should also be made for the storage of the teacher's wraps and personal items. A full-length closet of sufficient interior height and width to accommodate adult garments is desirable.

Adequate and convenient storage space should be provided in the classroom for the various instructional supplies such as chart paper, paints, and other similar items. Both open and closed shelves for books and other materials are needed. Often, such shelves are constructed under the classroom windows. It is desirable, however, that one portable section of shelving be provided to facilitate the movement of materials about the classroom and building.

Floors should be covered with asphalt, asbestos, or vinyl tile if concrete slab construction is utilized. If not, the floors should be of hardwood.

Adequate provisions should be made for the control of ventilation, acoustics, heat, and light. Classroom comfort, flexibility, and efficiency depend in large measure upon proper regulation of these factors.

Approximately sixteen to twenty linear feet of chalkboard should be provided. One chalkboard should be placed at the front of the classroom and a smaller one on the side or rear of the room. This smaller area could serve as the center of a teaching nook or corner for individual or small group instruction.

Sixteen to twenty linear feet of bulletin board space should also be installed in the classroom. It should be arranged in large units rather than in small areas because of the limitations inherent in small display space. Large bulletin boards provide ample space for the display of murals, samples of work, and any number of other items and materials. Too, they supply sufficient area to permit flexibility of organization and presentation of materials.

Each classroom should have a work area or counter covered with smooth, waterproof material and equipped with a sink and a hydrant. The counter height should be governed by the size of the children who are to use the classroom. A drinking fountain, located as inconspicuously as possible, is also desirable.

In the primary grades, toilet facilities should be provided either in or directly adjacent to each classroom. The same may be done for the upper elementary grades or, if preferred, gang toilets may be utilized. In the latter case, however, they should be located near the classrooms so as to be easily accessible and easy to supervise.

Correct furnishings are a must if a school building is to truly fulfill its purpose. Just as the proper furniture helps to make a house a home, so should the school furniture, fixtures, and equipment amplify and complete the total learning environment of the elementary school.

Again, educational philosophy is a principal determinant of the type and quality of furnishings provided. Perhaps somewhat more realistically and practically, it also very definitely determines how they are utilized day by day.

School furniture should be attractive, safe, comfortable, and well-constructed. Its cost should be considered in terms of its probable service life. Well-built furniture, although somewhat more expensive initially, may very well prove to be the most economical over a period of years.

The same comment might also be made with regard to materials used in the construction of the furniture. In this connection, it appears that more use is being made of plastic and Fiberglas, particularly for tops, seats, and backs. Such materials apparently are proving to be both comfortable and durable.

Most teachers like to have extra tables in the classroom for display of books and other materials. Particularly in the primary grades, some extra chairs are desirable so that the teacher can more easily work with a small group away from the rest of the class. This practice is quite useful in reading, arithmetic, or in any other area where small group instruction is particularly advantageous.

Color has been found to be a factor of major significance in its effect upon people. Undoubtedly, every person reading these lines can recall distinctly a number of personal experiences and reactions which would lend credence to that statement.

Many older school buildings were very dull, drab, and uninviting. In more recent years, however, the improved use of color has helped to make school a brighter, happier place in which children actually feel more like living and learning. Bright colors, strategically utilized, promote a more attractive and inviting atmosphere. Soft, pastel shades tend to produce a soothing, calming effect, thereby creating an atmosphere of comfort and quietness. The proper and scientific use of color throughout the school plant is essential to the development of a learning environment of the highest caliber.

Plus Features

Several factors determine the type and nature of the "plus" facilities that should be included in an elementary school building. Some of the more important of these determining elements are the philosophy and program of the school system, the needs of the community, and the amount of money available. Some systems apparently attempt to provide every conceivable type of facility, while others limit themselves—either through choice or necessity—to the barest essentials.

In recent years, considerable study and experimentation have been directed toward the multiple ultilization of space. School systems would do well to become familiar with such efforts and to profit

from the knowledge and information thus obtained.

The Administrative Area

The administrative area should stimulate pleasing reactions. It should present an attractive, inviting, and friendly atmosphere, yet one that is also dignified and challenging.

The entrance should seem to flow in from the out-of-doors, and be easily accessible to parents, teachers, and students. In general, it seems to be the consensus that the administrative suite should include the following areas.

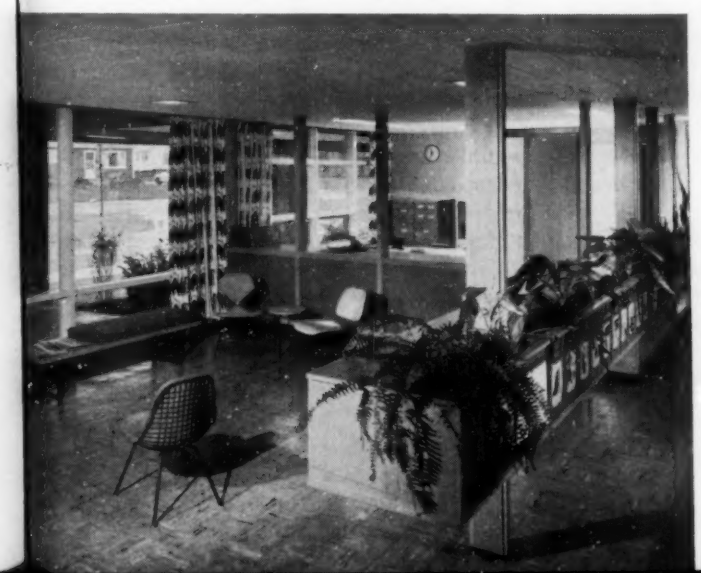
Reception room or foyer: The reception room or foyer need not be a large area, since there are seldom more than four or five people waiting in the office at any one time. It should be an attractive and inviting place, for it serves as a show window and is normally the first contact that new people have with the school. The reception room should give the guest an impression of warmth and cheerfulness. It will certainly have a constructive effect on his initial impression and reaction if, as he enters, it seems to say "welcome."

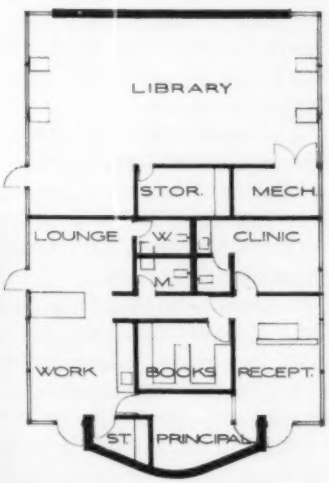
Secretary's work area: The secretary's work area should be large enough to permit the efficient performance of her many duties. It should be suitably equipped with such items as a desk, work table, filing cabinets, typewriter, adding machine, duplicating machine, intercommunication system, and teachers' memo boxes. The flexibility of the furnishings of the secretary's work area should make it possible for other arrangements when more space is needed.

Principal's office: The principal's office should be located near the reception room and the secretary's work area. It should be readily accessible to the public, yet should have a quiet atmosphere conducive to concentration. The office should be designed and arranged to permit private conferences without interfering with or being disturbed by activities in other parts of the administrative suite and building. Adjustable shelves should be provided for books, periodicals, and curriculum materials.

High windows may be preferred since they permit greater privacy and create a

This lobby welcomes the visitor





Floor plan of an administrative suite. Bruce Russell, and Associates, Architects, Tyler, Texas.

sense of spaciousness by allowing better furniture placement in the smallest amount of space.

Clinic: The clinic or health room, used for first aid purposes, should be somewhat isolated from the other areas, but should be adjacent to the secretary's work area so that she, in the absence of the school nurse, can be responsible for its use. Two small beds, a desk, filing cabinet, and shelves are usually ample for the room. Both open and closed shelves are desirable. Open shelves are excellent for large items and the enclosed shelves house medicine and small supplies. First-aid supplies should be kept in a special place, readily accessable for emergency use.

Bookroom: Since the principal or secretary is usually responsible for textbook accounting, it seems advisable to locate the bookroom in or near the administrative suite. It should contain enough open shelves to store the schools' textbooks with some adjustable shelves to handle odd-sized books.

Teachers' lounge: The lounge should be a place where the teacher can feel free to relax and take a much needed "break." Large comfortable chairs should be provided and a couch, although not a necessity, is welcome.

A combination dressing and writing table with soft lighting is a nice addition to the furnishings. Although the room does not need to be large and elaborate, it should be comfortably furnished and as attractive as possible.

Teachers' workroom: The teachers' workroom, a many-faceted area, is one of the most important rooms in the school. It serves many purposes and should be planned accordingly.

Color appointments should be pleasing, yet unobtrusive. Furnishings are not only part of the decor, but determine greatly the usability of a room. These need not be expensive to be attractive and workable. They should be movable so that groupings may be arranged to suit the individual situations that may arise on a busy school day.

Comfortable chairs are a necessity. Small tables, light and flexible so they can be moved with little effort to form larger tables, are preferable to larger, more cumbersome tables.

Adequate lighting is a necessity for the workroom. Lights should be placed to fit various needs that might arise. All important work areas should be well lighted. A strategically placed lamp also adds warmth to the friendly motif of the entire room.

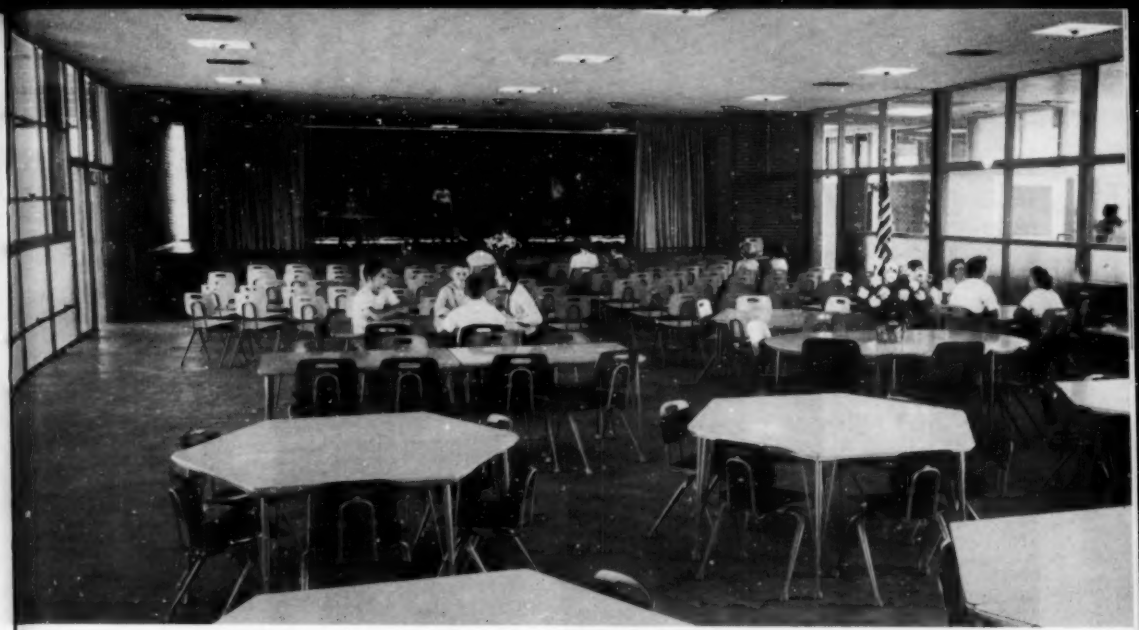
Both open and closed shelves should be installed to permit the storage and handling of supplies. Open shelves are suitable for such items as construction paper and tagboard, while closed shelves are satisfactory for smaller supplies. There should also be ample shelves for the storage and display of professional and curriculum materials.

A sink and a waterproof cabinet top are indispensable to a properly equipped workroom. In addition, typewriters, papercutters, and duplicating equipment should be available for use by the teachers. Counter-level windows, which eliminate conventional boundaries of space, are desirable. They create a sense of openness which is a considerable improvement over the shelved, enclosed workroom of other days.

The workroom serves as a meeting place for teachers to visit and talk shop, for faculty meetings, committee meetings, and for conferences with parent groups. The social atmosphere which can prevail in a room such as this is invaluable in promoting and maintaining school spirit and unity on the part of the faculty.

The Cafeteria

A cafeteria or lunchroom is usually considered to be one of the essential plus fea-



This cafetorium is used for dining, student assemblies, adult meetings, music groups, and other specialized instructional purposes

tures of an elementary school. There is considerable variation, however, in the specific provisions and arrangements for lunchroom organization and operation in schools.

Some systems utilize a central lunchroom solely as a dining hall, while others use the space for other activities as well. Some systems prefer not to have a lunchroom, but cart the food from a central kitchen to each classroom or to several multi-purpose rooms strategically located to serve the entire building. Each arrangement has its advantages and disadvantages; each school system must make its own decision as to which method of operation is most desirable and then plan the building accordingly.

Regardless of the type of dining facility that is provided, the school lunch program must involve more than a child getting a bite to eat. It must be justified educationally. Its operation and environment should lead to the development of better social habits and attitudes among children.

Physical Education Facilities

Another essential to an elementary school is the provision for supervised play or physical education facilities. Currently, this varies from complete gymnasiums and outside play areas to nothing at all except the classroom and a small, crowded play area immediately adjacent to it. Some systems use the cafeteria for indoor activities, while others have a playroom and/or a sheltered outside play area. A multi-purpose room may be used for certain types of physical education activities. In many sections of the country, an extensive physical education program can be carried on outside without interruption except for a few rainy days.

Again, the type of physical education facilities provided obviously depends upon the desire and will of the district. It might be remembered, however, that with less emphasis on organized, competitive athletics and more emphasis on a comprehensive physical education program with adequate facilities for its implementation,

The creative use of glass, modern furniture, and interesting architectural detail help to make these two libraries inviting

every elementary school child stands to benefit.

Library

A library or "learning laboratory" should also be considered a necessary part of a complete elementary educational program. Most of the newer elementary school buildings include reasonably adequate library facilities. In numerous instances, however, as larger-than-anticipated enrollments have made their appearance, it has been necessary to use the library as a regular classroom.

In the sense that it is a true learning laboratory, the library is perhaps just as important as any of the classrooms in the school.

The elementary school library can and should be a nerve center for the school. It may be located in a specially designed room or, as is done in some instances, placed in a multi-purpose room. In any case, whatever provision is considered practical and desirable, adequate library facilities and services should be established and maintained in all elementary schools.

Assembly Area

Each elementary school should have suitable facilities for student assemblies and for the accommodation of adult group meetings. Such space may be provided in one of several ways. Some schools have complete auditoriums, designed primarily for adults, with slanted floors, fixed seats, a large stage, and acoustically treated interiors. Others may utilize areas which were actually designed for other purposes. For example, in recent years, there has been increasing adaptation of cafeterias and gymns for this purpose with fairly satisfactory results. In such instances, if a stage is not provided, a small portable or folding stage can be located on the side

of the gymnasium or at the side or end of the cafeteria.

Where a smaller assembly area will suffice, a multi-purpose room is quite satisfactory, especially if it is equipped with a folding stage. Usually, regardless of what type of space is provided, except, of course, in an auditorium, it is advisable to use folding or stacking tables and chairs both for flexibility and for convenience in storing.

Special Education Facilities

The schools must provide adequate facilities for the instruction of students who are in need of special attention. Mentally and physically handicapped children fall into this category.

In terms of physical organization and location of facilities, there appear to be two chief plans of providing for special education.

In some cases, facilities are arranged so that children receive their instruction in a separate class, but one that is an integral part of a regular elementary school. Proponents of this plan contend that such arrangements make it possible for special education students to feel that they are a definite part of the school; that it develops a greater sense of belonging. The children may eat, play, sing, and attend assembly programs with other children of their age, yet still have the advantages of a small class, a teacher with special training, and facilities and equipment designed to meet the specific needs of a particular type of handicapped condition.

Other educators feel that the program of special education for handicapped children can be best implemented by providing all facilities in a separate or centrally located building, rather than having several units attached to different schools. This arrangement makes it possible to concentrate personnel and equipment to serve the needs of children with a greater degree of efficiency.

It is quite obvious that facilities for crippled children should be located on a building's ground floor and situated near an entrance drive. The rooms should be convenient to any other facilities which are utilized, such as the cafeteria, auditorium, and other general use rooms. Special ramps for wheel chairs may also be needed.

Restrooms should be provided either in or immediately adjacent to the classrooms. The doors should be wide enough to permit passage of wheel chairs. Cots should also be provided so that rest facilities may be available when needed.

There should also be a specially designed room for the instruction of children with speech and hearing difficulties. The room should be sufficiently large to accommodate five or six children at the same time. It should be designed and arranged to be free of external noise, distractions, and interruptions. When not being used for speech and hearing instruction, the room may be quite suitable for small group meetings or as a conference room.

Music

Music instruction is a very vital part of the elementary school program. As in the case of other "plus" activities, however, adequate provisions for music instruction depend upon the philosophy of the school system and community as well as the availability of funds.

Many systems feel that well-trained teachers are sufficiently equipped to handle an adequate program of music instruction. In such instances, the system may provide for a music consultant or supervisor on its central staff. Special aids, such as record players, a good supply of records, autoharps, flutophones, and other appropriate instruments and materials, are also supplied for the teacher.

If the foregoing is characteristic of a system's program of music instruction, it is probable that the instruction is normally given in the classroom itself. There may be other facilities, such as a piano, located in another area so that music might be provided for assemblies, adult meetings, and special programs.

Other school systems feel that classroom teachers in the main are unable to handle music instruction adequately. They employ specially trained music teachers, particularly for the upper elementary grades. In this case, a special room is usually provided and suitably equipped to facilitate the instruction. The location of the room should be such as to permit vocal or instrumental instruction to be carried on without interfering with the rest of the school.

Audio-Visual Aids

Audio and visual aids have always been two main avenues of instruction and learning at every level. Formerly, they consisted chiefly of the teacher's voice as the audio and a blackboard as the video. In recent years, however, there has been increased attention to making the learning environment fit the subject or concept under study. Also, educators realize the importance of presenting material and information in as many different ways as possible. The recognition that the best job of teaching requires more than a book, a desk, a blackboard, and an eraser is apparent by the presence of many other instructional aids and materials—bulletin boards, maps, globes, charts, pictures, displays, reference books, and a host of other equally valuable items. Usually, the room and these materials are arranged so that two or more teaching centers are utilized.

The provision of an adequate number of conveniently located electrical outlets is a must for every room. The almost universal utilization of radios, phonographs, recorders, and all types of projectors is being increasingly rivaled by that relative newcomer on the educational scene, television.

A number of elementary schools today are giving consideration to the provision of special rooms to serve as laboratories for the introduction of foreign language instruction. Various specialized instructional aids are provided, including recordings with audio connections to headphones, thus emphasizing an individualized approach to instruction. Such facilities are supplemented by other areas where larger groups may be assembled for instructional activities suitable for mass presentation.

It appears to be generally agreed that best results are obtained when audio and visual aids can be employed as an integral part of the regular teaching program. The consensus seems to be that some of the instructional value is lost when it is necessary to move children in order to create an audience situation. If this is true, then it has rather obvious implications with regard to the planning and design of the elementary school building and its instructional areas.

Considerable progress has been made, however, in the development of equipment which can be used in regular classrooms, even where there is a large amount of window area and natural light. Daylight screens make it possible to use visual aids where the cost of darkening the room is prohibitive. Also, more recently, equipment has been developed which, like television, can be viewed without the necessity of darkening the room.

Good physical facilities, equipment, materials, and supplies will not necessarily guarantee a good educational program. But they can help. Good teachers can become better teachers, good schools can become better schools, and good communities can become better communities when better educational facilities are provided.

Therein lies our challenge!

EQUIPMENT for the Elementary School

Russell E. Wilson **James R. Hood**

MUCH of the content material for this chapter could not have been written five years ago. During the intervening years, there has been a revolution in elementary school equipment.

Based on new research in child development, school building design, and raw materials, the recent efforts of equipment designers and manufacturers have resulted in thousands of more functionally designed equipment items. The major elementary school equipment problem facing educators today is not trying to find suitable equipment, but rather identifying and defining the educational needs to be served by school equipment. The chances are now that when educators draft their "educational specifications" for school equipment, the market place will offer a choice of good and appropriate equipment sufficient to meet them. It is the purpose of this chapter to assist educators in their task of preparing sound educational specifications for elementary school equipment and to present some of the thinking about equipment which should lie behind their locally made decisions.

These decisions about school equipment have a significant effect on the educational program. Almost half the waking hours of elementary school children are spent in school surroundings. School equipment can be as important to the physical, emotional, and intellectual welfare of children as any other tools for learning. There may be great value in the educational situation imagined as Mark Hopkins and a boy on a log. But is it not likely that even this learning experience would be significantly better if Mark and the boy were comfortably seated in a warm, friendly, well-lighted room?

Planning for School Equipment Needs

Some rather weird things are purchased in schools where money for equipment is treated about like pin money at home. From time to time, but too infrequently, some money just seems to float to the top

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of the school budget. Miss Jones is startled when she gets word that she has struck gold and is to be allowed x dollars for new equipment. She is so unaccustomed to this experience that she is baffled by the questions of what to buy and how to find out. All too frequently, the situation is the same even when thousands of dollars worth of equipment is to be purchased for a new building. Where to start and which way to go and what to do to determine equipment needs merit some explanation.

But, first, the statement should be recorded that the take-off point is not with some arbitrarily allocated sum of money, more or less, as may be set aside for equipment. If it is necessary to start the equipment selection process with the matter of money, then let it be done in an orderly manner. School districts often operate under a system whereby the general promise appears to be: pay all the salaries and all the bills and, if there is any money left, divy it up by lot for equipment and supplies. All too often, new building projects are budgeted on the premise: build the building and hire some teachers and, if there is any money left, buy some equipment.

More orderly processes for the proper determination of equipment needs should produce budget estimates of equipment costs for a new elementary school building which will equal at least eight to ten percent of the total building cost. If real emphasis is placed on well-equipped activity programs, this ratio will be rightfully exceeded. These arbitrary figures are mentioned in the hope that preliminary budgets for building projects will include some such amounts.

The real hope, though, is that planning processes will be established to determine equipment requirements on the more sound bases of the needs of the proposed educational program, the needs of a healthful, safe physical environment for youngsters, and the physical, emotional, and intellectual needs of pupils as human beings.

An orderly local cooperative planning process should be established to consider these factors, to develop educational specifications for equipment, and to arrive at a list of equipment items for each school building project.

Locally oriented cooperative planning processes offer the soundest approach to the determination of equipment needs. These committee systems, involving teachers, custodians, nurses, administrators, students, and parents, and recommended methods and processes are described in considerable detail in several other publications.[1]

A committee can use a variety of planning processes: 1) activity analyses of the educational program; 2) a description of the local school philosophy and teaching aims and methods; 3) visitations by some committee members to well-equipped new buildings; 4) attendance by some committee members at equipment exhibits at conventions; 5) collection and study of up-to-date equipment catalogues; 6) collection and study of equipment samples of major items such as seating and cabinets; 7) presentations by salesmen of suggested classroom layouts and equipment samples.

These planning committee activities should result in educationally valid and economically sound educational specifications for school equipment tailored to fit each local situation. The recommendations should then be reviewed by the properly designated administrative authority and, in turn, be accepted or modified (with the knowledge of the committee) and approved by the board of education. It is best that the building principal or, in his absence, the chairman of the equipment planning committee assume the major responsibility for both the educational and economic soundness of the committee recommendations.

The value of the cooperative planning process can be measured by the degree to which committees invest time and effort to inform themselves and to push forward educational thinking. Conversely, if the committee reports reflect a pooling of little knowledge or the solidification of obsolete thought, not much will have been accomplished.

The discussion of major elementary equipment items which follows may be useful as a catalyst for the work of committees.

Criteria for Selecting Equipment

While elementary school equipment ranges from chairs to chalkboards to cabinets to desks to slides and swings, some common elements of value or general criteria of goodness have been developed. Most individual items of elementary school equipment should meet these criteria. However, some of them have particular applications to specific kinds of equipment. For example, the criterion of *safety* has emphatic application in the selection of playground equipment, while the criterion of *comfortable* applies most directly to classroom seating. It will remain for the discriminating purchaser of equipment to select the criteria most applicable to any one equipment item. The criteria themselves have been developed from a number of sources; even so, there is a substantial amount of agreement among them.

In general, elementary school equipment should have the following characteristics. It should be:

- safe and healthful
- light in weight and easily movable
- readily groupable
- readily storable
- rugged and durable
- comfortable and conducive to good posture
- child-sized and child-scaled in dimensions
- beautiful in form, texture, and color
- compact in keeping with its functional requirements

In addition to these rather specific characteristics, equipment should be selected so that it contributes to learning situations by:

- fulfilling the function for which it is intended
- providing a sufficient variety in each room of seating stations, work stations, and play stations to accommodate a wide range of individual differences in size and interest and teaching methods
- being mechanically simple to operate or adjust and yet quiet during movement
- having appropriate finishes, textures, and colors to meet the accepted standards for visual conditions in school rooms [2]

The over-all significance of this last general criterion may be realized from the conclusion reached by C. Sheard: "There is a consumption of a quarter of the bodily energy in the process of seeing. When vision is normal, the ease of seeing is controlled almost entirely by sufficient and proper lighting. However, when the illumination is improper or inadequate, and when vision is poor, then the consumption of bodily energy is increased . . ."[3]

Equipment, including furniture, cabinets, and chalkboards, are *in toto* a major factor in the creation of visual conditions within a classroom. Those responsible for the selection of equipment and the teachers who use it ". . . have a continuing responsibility for protecting the eyesight of children by the proper use of school furniture and by instruction in the proper use of light."[4]

The general qualities for school equip-

ment which have been listed above should be sought in the selection of school equipment. As the educational specifications are prepared and as later the bid specifications are written for individual items of equipment, appropriate criteria should be incorporated into these specifications. In the sections of this chapter which follow, recommendations have been made concerning several kinds of elementary school equipment which may serve to illustrate applications of the criteria which have been cited here.

There is yet another major consideration which should permeate most selection processes of school equipment—the effect of school equipment on pupil posture. This matter is of such importance that it is discussed separately.

Posture

A classroom full of chairs, desks, tables, or work counters all of one uniform height, or an elementary school library completely equipped with adult-sized tables, or a school shop with a bank of wood lathes all of uniform adult size are common evidence that the matter of student posture is frequently neglected. There is a serious suspicion that the educators and architects responsible for the selection of such uniform and neat equipment have been more concerned with the visual pleasantness of orderly arrangements than they have been with the strains and stresses created in the bodies of youngsters by ill-fitting school seating, work counters, and playground equipment. In contrast, in instructional matters elementary school educators insist on proper attention to individual differences among pupils. To those concerned with selection of school equipment it is equally valid to insist on proper recognition of physical individual differences.

More than a quarter of a century ago, one of the early serious researchers on school seating and posture, Henry Bennett,[5] deplored the practice of many educators of selecting *all* school seating to contain the largest, roughest boys imaginable to the neglect of the fact that the preponderance of an elementary school class is composed of girls and frail boys. In all too many classrooms, these same unfortunate conditions still prevail. In fact, a substantial number of the same classrooms with their same ill-fitting furniture surveyed by Bennett are still in use today.

Teachers have recognized, in some degree, their responsibility for good student posture and the correlation between learning and posture in the simple, oft-repeated dictum, "Sit up straight and pay attention." This classroom aphorism finds substantial support in the research of Bennett and in numerous reports by the American Medical Association. A more recent publication by Evelyn Davis presents current data regarding posture and learning and school equipment. One of the best analyses in this publication is the study of posture as a *dynamic* term rather than a *static position.* Within this concept, which is most applicable to elementary school situations, each individual possesses not one, but many postures. To quote: "These postures may be defined as the positions or relationships of body parts while sitting, standing, walking, running, or during any activity. These true relationships are present whether or not the individual is under [teacher] scrutiny."[6]

On one educational front, educators are being urged as the result of research to consider the child as a psychological unity. As the result of research by physiologists, Davies' statement deserves equal consideration: "Our bodies are so built that when one part is out of alignment, the whole body is affected. In other words, and this cannot be emphasized too strongly, misuse of one part of the body

Movable furniture helps to make this classroom serve many different learning activities

may start a chain reaction felt throughout the entire body."[7]

It is recommended first, then, that all considerations for the *selection* and *use* of elementary school equipment should be based on a knowledge and appreciation of the implications of posture as a dynamic force in the growth patterns and daily activities of youngsters. The reports by Davies and Bennett are adequate educational treatment of this matter of school posture. A somewhat more simple and more direct analysis of posture problems has been prepared by a national organization devoted to selling posture seating, the National Stationers Association. Their definition of good posture is simple. "It is that position in which the various parts of the body function most efficiently."[8]

Second, it is recommended that all elementary school equipment be selected with due regard to the range of physical individual differences common in most classrooms. Fortunately, some recent research provides us with adequate data on the physical dimensions of children in various school posture positions.[9] This data gives guidance for the selection of properly dimensioned school equipment—be it chairs, tables, counters, or chalkboards.

Third, it is recommended that educators and architects develop the mental routine of observing children and their school equipment with such questions as these in mind: "Are there left-handed desks for left-handed students? Is the child with the vision or hearing defect sitting close to the front? Can each child place his feet flat on the floor while sitting with the base of his spine against the back of the seat? Is the table a convenient height or must he hunch his shoulders or reach to rest his arms on the table? Does the back rest of the chair support the lower spine (small of the back) and is it small enough and low enough to miss completely the shoulder blades?"[10] This last question is especially vital.

It is difficult to justify the present situation with regard to the selection of elementary school equipment. Such fundamental equipment as seating is usually selected only once every twenty-five to fifty years. In most instances, children are expected to move into a classroom or library and to take their chances as to whether or not they can find a seat or desk that fits them. Some height of absurdity is reached when students are assigned seats in alphabetical order; then the statistical chances of getting a good seat approach zero.

Classroom Seating

Furniture sets the basic degree of educational usability of a classroom. It may make the educational program as fixed and rigid as seats screwed to the floor. More than any other equipment item, classroom seating affects and conditions the school days of elementary school youngsters. As the evidence accumulates that school children are becoming more sedentary,

seating problems take on additional importance. Therefore, several aspects of the problems of seating selection will be discussed in detail.

The term "classroom seating" frequently encompasses more than "seating" for it includes chairs and desks as well as various combinations, such as universal desks, tablet arm chairs, chair desks, benches, tables, and free standing book box and open front desks. In light of the criteria mentioned earlier, we shall discuss chairs as "seating" and desks and tables as "work surfaces." Combination units of chairs and desks merit little attention because they violate most of the criteria governing the proper selection of furniture.

In discussing basic classroom chairs, the term is meant to identify the kinds of chairs that are used as regular classroom seats, primarily in conjunction with a table as desk. From the criteria enumerated earlier, the following have important application to chairs: 1) child-dimensioned; 2) comfortable; 3) light and stackable; 4) rugged; 5) mechanically simple and quiet. Many newly designed chairs for the classroom have these characteristics.

There remain still the matters of chair size, chair fitting, and other types of classroom chairs. The studies by Bennett and Martin indicate that usually classrooms should be equipped with chairs in at least three sizes to accommodate the normal range of individual differences. So-called "adjustable" chairs cannot be recommended because the adjustment is limited in most cases to just one dimension — vertical seat height. The seat "front to back" dimension and the seat to "top of back support" dimension are much more crucial factors and can best be accounted for in well-designed single unit chairs. Perkins summarizes the experience of many when he says of adjustability: "While there are a number of kinds of seats which can be adjusted mechanically . . . the chances are they won't get adjusted often. And anyway if various people use the same seat, a man with a wrench would become a permanent part of the scenery.[11]

Once chairs have been properly selected, there remains the task of fitting individual children to particular chairs. One workable set of rules is found in the 1949 yearbook of the American Association of School Administrators.

Seat

Height — Pupils' feet should rest flat on the floor and support sufficient weight so there is no pressure on under side of thigh at front of seat.

Depth—When pupil's back is properly supported by back rest, there should be three or four inches clearance between front edge of seat and inside angle of knee.

Slope—The seat should slope slightly down towards the rear to overcome tendency to slide forward.

Shape—The seat should be shaped so as to distribute the weight over a large area, without undue pressure on any specific points. There should be no rail, ridge, or other obstruction at rear of the seat which would prevent the extension of the buttocks beyond the back support.

Back Support

Width—The back support should contact *only* the lumbar region or hollow of the back between the hips and shoulder blades.

Slope—The slope of the back support will depend upon the total chair design, but should support the pupil's back while sitting in an upright working position. Further, the best back supports will be designed with a slight degree of resiliency.[12]

Each pupil should be assigned his own chair as his chair—one that is fitted to

him as outlined above. In addition, there should be a few lounge or informal chairs available for reading and relaxing.

Work Surfaces

The natural complement of pupil chairs is some form of horizontal work surface, usually a desk, table, or counter top. Most commonly, our concern is for a suitable single or double unit table or desk for reading and writing. But it is important also that some work surfaces of a more varied and larger variety be included in each classroom to accommodate projects, displays, reading materials, and committee work.

Some of the simpler conflicts about pupil work surfaces arise over the relative merits of single place, double place, and multiple place units and over the related matter of book storage of the lift-lid box type, open-shelf type, or drawer type. Personal opinion, rather than research, is likely to continue to govern selection on these features of work surfaces. But there is research regarding the ideal position for each of the various types of regularly assigned seatwork.

Reading is most efficient when the reading material is held at 90 degrees to the axis of the eye. If the head is bent slightly to 20 degrees, then the book angle should be at least 70 degrees. Some slight desk top angle for the book, such as 10 or 20 degrees, is likely to do harm by encouraging students to bend their heads 90 or 80 degrees. Writing is most efficient when the paper is at a slight upward angle, some 5 to 10 degrees. However, the work-a-day world of writing desks, tables, and counters is preponderantly horizontal.

Drawing of different kinds involves various angular requirements from 0 to 90 degrees. Combinations of these tasks defy analysis. For better or worse, the most recent trend appears to be toward larger, flat, horizontal work surfaces.

After recognizing some of the basic conflicts over student work surfaces, there is still merit in selecting from the general lists of furniture criteria some that are more appropriate for horizontal work surfaces. They are: 1) finishes and textures for good visual conditions; 2) lightweight and movable; 3) easily groupable; 4) readily storable by nesting, stacking, or folding; 5) variety of sizes and shapes in each room. In addition, the quality of *adjustability* needs further comment. Theoretically, there is no wrong in adjustable tables. Unfortunately, in practice, the adjustments suffer from neglect and ignorance and, all too frequently, the adjustment mechanisms are a spot of weakness in table construction.

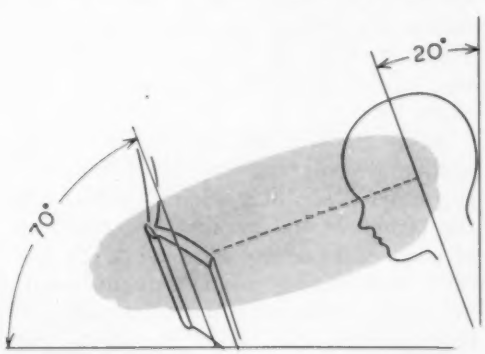
Appropriate heights for table tops can be found in the detailed studies of Bennett and Martin. There should be at least three different heights available in each regular classroom.

And, again, the AASA Yearbook presents some good general rules for fitting individual pupils to appropriate work surfaces. They are, in part:

DESK AND WORKING SURFACE

Height—The height of a flat-top desk should be one or two inches above elbow level of the pupil when properly seated and with the arm in a (lowered) vertical position.

Arm rest — Conventional tablet arm



chairs throw the spine and shoulders into an unnatural position, and should be discouraged.

Spacing — The total design of seat and desk will affect the horizontal spacing, but a comfortable working position will usually require that the desk overlap the seat by three or four inches.

Leg space — There must be sufficient space between the seat and desk bottom as table apron for free movement of the thighs, even if this requirement must limit the depth of a book box or drawer.[13]

Top materials for working surfaces merit a further comment. At the present time, the best available materials appear to be hard melamine plastics with a dull finish and a light color with a reflectance factor of 40 to 50 percent. There is hope that soon desks will have "soft" surfaces, comparable in writing ease to a pad of paper and yet rugged enough to withstand classroom wear and stains.

In addition to the work surfaces for seat work, there develop needs in most classrooms for many kinds of group work, projects, and displays. For these purposes, trapezoidal shaped tables are the most functional for grouping and stacking. However, consideration should be given to "S" shapes, round and half-round tables. One or two art tables with hinged tops are very useful. Under the strained financial circumstances of many school districts, the selection of two or three inexpensive home-type folding card tables, cut to appropriate heights, would represent a remarkable improvement in many cases.

Since students do live in their school seats more working hours than they do in any other place, and since classroom seating is one of the major three cost items of elementary school equipment, the selection and fitting of classroom seating merits the prime attention of teachers, administrators, and board members. How soon will the shibboleth be forgotten, "I move the contract be awarded to the lowest bidder . . ."? Willy-nilly.

Teacher Furniture

More consideration needs to be given to the unique needs of teachers for furniture. These requirements have not been completely analyzed so that today it is necessary to select teacher furniture and equipment on a rather vague basis, without sufficient attention to the functional needs of the classroom teacher.

It seems certain that one governing concept for selection of teacher furniture is that it should borrow its dominant characteristics from the home rather than from the office. Another changing concept of teacher furniture is that the teacher's desk is coming down from the raised dais, front and center, and is becoming an informal teacher work center. Pupils want to come to the teacher to visit with a friend about a mutual problem—not to face judgment before a taskmaster. Further, it is becoming evident that teachers need more and more equipment at their fingertips. With some of these unique requirements in mind, we can recommend that teacher furniture not only should meet the usual requirements for posture and comfort but also should be considered as a small suite of furniture—not just a table and chair.

To make a complete teacher work center, this suite should include: 1) a large flat-top work area on a table or desk; 2) conference area as part of the table or desk; 3) at least one two-drawer file on casters to accompany the table; 4) a book truck; 5) a television and visual aids unit. These rather specific recommendations have been itemized because of the lack of sufficient experimentation on teacher work centers. No single item of equipment meets all of the needs of all classroom teachers.

Cabinets

In recent years, there have been some revolutionary changes in classroom cabinets and casework. Flexible, movable, sectional, factory-finished cabinets are now available to meet the needs of almost all elementary school classrooms.

The classroom needs for such cabinets have multiplied in recent years. As students are assigned to particular classrooms for longer blocks of time, as classrooms become more self-contained in operation, as more teaching functions and materials are allocated to each classroom, and as more bare rooms and spare rooms are pressed into classroom use, a premium is placed on adequate cabinets. For almost centuries of school building design, the prime function of classroom cabinets was that of static, unmovable, dead storage for seldom-used supplies and equipment. To this original storage function of cabinets many new uses can be added today. Modern sectional, movable classroom cabinets serve as work counters, room dividers, display areas, science demonstration desks, supply and book trucks, and audio-visual materials centers.

Movable sectional cabinets have particular usefulness for teachers who rearrange their rooms to accommodate changing teaching methods and class projects. Cabinets with these characteristics and with others, such as replaceable parts and height adjustability, have several advantages in long-range room use. Sectional cabinets can be purchased as individual items, can be moved from room to room as teachers' programs require, can be changed in height as grade room assignments change, can be moved from old or temporary rooms into new facilities, and can simplify design and construction details.

Many movable classroom cabinets are fitted with shelves and drawers and cubicles to accommodate particular kinds of supplies. Some, such as book trucks, science tables, handwork benches, audio-visual equipment, and art easels, have even more specialized features.

Since classroom cabinets are usually one of the three most expensive items in elementary classroom equipment and since well-selected movable cabinets can metamorphise a dead, bare room into an adequate educational workshop, it would seem worth the effort for teachers and administrators to give careful thought to their selection. This might include preparing an analysis of planned classroom activities and itemizing and describing by size, shape, and quantity all the supplies and equipment to be housed or stored in each classroom.

With a good educational analysis as the basis for selection, classroom cabinets will be more useful than if their selection is dominated by architectural and budgetary considerations.

Chalkboards

Thousands of times each school day some teacher frowns as she tries to clean a chalk smudge from her dress; thousands of times each day some student squints and squirms as he tries to see through chalkboard glare; and thousands of custodians mutter as they end their tired work day trying to clean antique boards and erasers. Although man has been practicing wall writing and drawing since his early cave age days, there has been little improvement in this basic classroom equipment in centuries of design. There is sufficient reason to pause more than just briefly in our consideration of classroom equipment on the matter of chalkboards.

Throughout the centuries of classroom teaching, chalkboards, in one form or another, have remained the most common of all items of classroom equipment; they

are even more universally used than paper and textbooks. Fortunately, chalkboards do not have to be considered any longer as just an expensive, universal "problem" in classroom equipment. Now there is sufficient technical knowledge available for designers to stop planning chalkboards as if classrooms were still-life pictures.

Under current conditions of elementary school planning, chalkboard selection and design are victims of the general building budget and are often neglected by architects and educators. If the school is to be an "economy" model, some poor composition board is specified. Then after the whole building is designed, a draftsman or equipment salesman is assigned to fill in some chalkboard on any blank wall space. Teachers and principals contribute by some vague direction, such as, "Put the chalkboard on the front wall of the classroom and some more wherever there's space."

From the numerous types of chalkboards and chalkboard materials now available, educators and designers have enough choices to solve all of the recurrent chalkboard complaints. First, the common teacher complaint of "too much" or "too little" chalkboard room can be resolved by such techniques as reversible sections; multiple leaf boards; sliding sections, either horizontal or vertical; stacking sections, hung on a continuous top molding strip; and a portable section in each classroom, mounted on the back of a book truck or storage cabinet.

Second, the common student and teacher complaint that they cannot "see" the chalkboard can be overcome by increasing the general light level in classrooms; planning classroom lighting systems to eliminate glare on the chalkboards; providing supplemental light fixtures aimed at the chalkboards; matching the color and chalkboard materials to the appropriate chalks and paints to produce adequate contrasts; installing ultraviolet light fixtures over chalkboards and supplying fluorescent chalks; and using modern vacuum cleaning brushes on chalkboards and erasers.

Third, the age-old complaint that chalkboards are "hard" and "scratchy" to write on can be improved by installing boards with resilient mounting; specifying boards made of soft materials, such as linoleum or vinyl; and installing curved or slanted boards to improve the writing angle.

Fourth, the vertical height location of built-in chalkboards creates numerous complaints as rooms designed for one age group are assigned to other groups. These problems do not occur when chalkboards are installed with brackets which provide easy vertical adjustment and with some panels installed at teacher work height in lower elementary classrooms.

Fifth, the economics of chalkboards can be improved and perhaps the over-all costs reduced. This can be accomplished by buying more useful educational features, such as reversible sections, while eliminating expensive non-function trim and chalkrails; taking advantage of the economies of factory-produced preframed, sectional boards in place of on-the-job, hand built, and hand trimmed boards; and purchasing dual purpose movable boards.

Display Surfaces

Every questionnaire answered by teachers about elementary classroom design records disagreement on numerous items. But questions about display space or tackboards produce a rare unanimity and a simple answer—*more*. As teaching methods involve increasing amounts of instructional materials and as more emphasis is placed on individual creativity, demands for more classroom and corridor display space increase. Fortunately, designers can and have responded to the teachers' demand for more display area.

One of the stimulating and significant improvements in classroom designs in recent years has been the improvement of display space in the designs of many school architects.

In many newer schools, entire walls of classrooms and corridors are designed as display surfaces. A variety of inexpensive materials are available for such functions. Occasionally, conflicts develop where custodians want "hard surfaced" walls for ease of maintenance and teachers want "soft surfaced" walls as tackboards. These differences can be resolved by such devices as soft wood or cork batten strips on tile walls and magnets used as tacks on metal walls. Adhesive tapes frequently create problems for both teachers and custodians; often they drop off at inappropriate times and with even more frequency they leave a residue on walls and chalkboards that is most difficult to remove.

Much of the previous discussion of chalkboards has some pertinence to display areas. However, there are some problems concerning tackboards or display areas that require separate comments.

First, frequently more display board area can be created in old and new elementary school rooms by installing walls or panels of soft wood fabric backed with tack material; installing reversible or portable tackboard sections; and supplying portable and collapsible display frames, such as are used for art exhibits, in each building and made available on demand to various classrooms.

Second, where the demand is for a greater variety of kinds of display facilities, there are advantages in installing adjustable shelf and display rails mounted on vertical, punched, metal strips; pegboard sections equipped with a variety of hardware clips and hangers to accommodate both flat work and solid objects; and soft wood strips shaped and spaced to be used as pin-up strips and grooved to hold photo-mounted mats.

Third, where the problem involves teacher-dominated or stereotyped displays, it is advantageous to place the largest display boards at a height and location readily accessible to students.

Fourth, where a school system has developed regular standards and sizes for art supplies and papers, it is wise to inform architects and maintenance crews so that tackboard areas and display rails are dimensioned properly.

Fifth, where teachers believe that students should manage and arrange displays, it is well to abandon certain forms of pins and tacks such as the common variety of straight steel dressmaker pins, and to install display boards suitable for various kinds of fasteners such as spring clips, magnets, and golf-tee shaped pegs.

Sixth, where tackboards are valued as instructional tools rather than as convenient wall covering materials, plans will be detailed so that tackboards will not be ruined by such secondary items as light switches, thermostats, and telephones located in the middle of them.

Most of the foregoing discussion of display boards has been focused on elementary school classrooms. But there may be more merit in suggesting that educators bring reality to the hackneyed phrase "halls of learning" by increasing their attention on designing halls as display and exhibit areas and applying some of these ideas to corridors as well as classrooms. If art is worth creating or mineral samples are worth collecting, both are worthy of displaying.

Clothing Storage

Almost any analysis of a given number of existing elementary school buildings will reveal numerous poorly used and wastefully expensive cloakrooms. This

same kind of random sampling is likely to reveal in many other buildings too great a number of built-in wall wardrobes equipped with expensive and complicated door hinges, brackets, and hangers—most of which will be bent, broken, or stuck. These same rooms are the ones most likely to be inadequately equipped with functional furniture and cabinets. Yet cloakrooms and built-in wardrobes are more expensive than a whole room full of good classroom furniture and movable cabinets. Nor do banks of steel lockers in corridors offer a much better or less expensive solution to the housekeeping problems of storing and drying student clothing, since they are noisy and costly to ventilate.

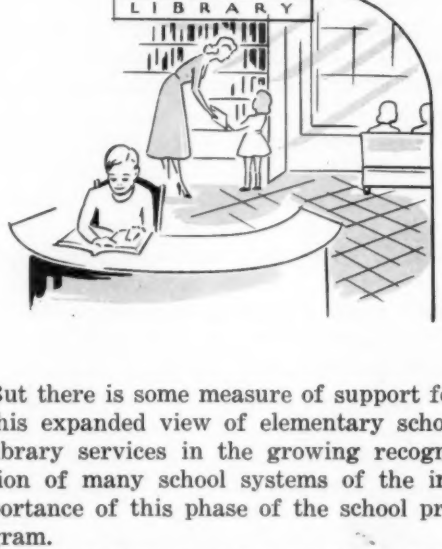
For these and other reasons, thousands of newer elementary schools are being designed with simpler and significantly less expensive clothing storage arrangements such as corridor shelves and hooks, movable cabinet wardrobes, and portable open racks. These arrangements offer greater pupil convenience, improved open and inexpensive ventilation, larger per pupil space for cumbersome winter garments, easier and less expensive custodial cleaning, and significantly lower original cost.

These types of clothing storage are open to the criticism that they are untidy and an open invitation to stealing. Such criticism in turn invites the rejoinder: "Is it better to encourage children to hang their clothing neatly out in the open or is it better to jam a locker full of stuff and then slam the door quickly before the junk falls out? Are a few hundred more locks the best answer to stealing in schools?"

Libraries

Many communities have been slow to recognize the educational values of elementary school libraries. But at this juncture, it seems reasonable to base our planning for elementary school libraries on these propositions. Elementary school libraries built today will be staffed with professional librarians before these rooms are abandoned. Elementary school libraries will soon be conceived as teaching materials centers rather than static book collections. Expanding elementary school library services will soon require suites of rooms to accommodate not only book collections and reading tables but also larger informal reading and browsing areas, librarian work offices, inactive material storage space, professional teacher libraries, student typing and writing cubicles, recording and listening tables, and science equipment areas.

Even the simple enumeration of these library service areas may have a heady effect on those who are suffering from a paucity of library staff and facilities.



But there is some measure of support for this expanded view of elementary school library services in the growing recognition of many school systems of the importance of this phase of the school program.

Most of the commonly accepted and still fundamentally useful items of library equipment, such as book shelves, book trucks, card catalogues, dictionary stands,

magazine racks, reading tables, and librarians' desks, will continue to be necessary in the future. But more is needed than just these traditional items of equipment. Elementary school libraries should be the most inviting, fascinating, and imaginative rooms in the building and the most accessible in terms of student and adult traffic, visibility through windows and doors, and open hours of service. Libraries should provide a variety of storage and use spaces for numerous kinds of teaching materials and learning devices and many different seating and working stations with chairs and tables of various shapes, sizes, heights, and materials.

Activities Room

Evidence has now been collected that activity rooms, or multipurpose rooms, are becoming a commonly accepted unit in most elementary school buildings.[14] However, this same report, as well as others, indicates a great deal of experimentation as to just what educational and/or community functions are to be housed and served by such rooms. Without unusually careful planning, some rather hodgepodge multipurpose rooms will be built. Frequently, the design requirements become so conflicting that such rooms become catch-alls rather than all-purpose rooms.

For many years, the design and equipment of activities rooms was commonly governed by one or two dominant purposes such as basketball or the school lunch program. Now it is stimulating to find wide adoption of many educational and community uses for these multipurpose units.

As more and more varied and even conflicting functions are assigned to activity rooms, the problems of equipping them multiply. Often, equipment has to be found for a room that at one moment will be dark for dramatics and at another well lighted for games, or for a large room for a PTA meeting which can be subdivided into two or three smaller rooms for committees. As a result, equipment should be highly mobile, flexible, folding or stacking, readily storable, and extremely durable. Furthermore, if activity rooms are to be used for adults as well as children, then there may need to be two or more sets of tables and chairs. The activity room should emphasize a large clear floor space surrounded by a suite of service and storage rooms or storage walls; the equipment is likely to include portable stages, wheel-equipped folding tables, and folding chair sets on storage racks in both adult and child sizes.

Principal's Office

As the role of the elementary school principal increasingly emphasizes instructional leadership rather than routine management, we should re-examine the criteria for the selection of furniture and equipment for his office. Where in the past the dominant theme has been to borrow furniture designed for business offices, now it is recommended that furniture selected for the principal's office should look towards such places as studies, dens, or libraries in private homes. Informal chairs or sofas should be provided so that the principal and at least two other people can be accommodated away from the principal's work desk or table. Storage and display of his professional library should be arranged to encourage frequent use.

A cold, uncurtained, bare-floored room, furnished with an antiquated massive wood desk and a closed, glass-faced, locked bookcase, is unlikely to stimulate either advanced educational thinking or exchange of personal confidences. It is time for principals' offices to be designed and equipped with care.

Playgrounds

With a flicker of sadness, it is necessary to note that many educators are apologetic to boards of education and critical citizens when funds are requested for playgrounds and outdoor equipment. Anthropological study is consistent in revealing that play has been a constant cultural pattern throughout human existence. And psychologists agree that play provides several deep and prolonged positive experiences for all animals, including human beings of all ages. There is ample evidence that play does make a fundamental contribution to emotional, social, and physical growth and happiness. Educators can, therefore, be straight forward in requesting ample playground facilities for all elementary schools.

It is also sad to record that nationwide statistics on sizes of school playgrounds reveal that over ninety percent of the existing school sites are shamefully too small. From these facts it is reasonable to conclude that the most direct, most simple, and the most universal solution to most playground problems would be to increase them in size. Certainly, this action by itself would produce a salutory revolution in elementary education. The addition of a few simple, inexpensive playground equipment items to each elementary school site across our land would suggest to multitudes of weary elementary teachers the approach of the millennium.

But some more probing writers, such as Evelyn Davies[15] and the playground committee of the Dearborn Public Schools,[16] have prepared penetrating and imaginative reports on desirable goals, activities, and programs for playgrounds. These reports are worthy of the serious attention of all who are concerned with elementary education.

Adequate space is the major ingredient in playground development. From a well-conceived playground educational program come the detailed needs for playground arrangement and equipment. Some of these principles can be enumerated as follows.

First, play space plans should emphasize *variety*: variety in topography—well graded game areas, small hills, little valleys, a small pond or stream; variety in surface treatments—a grass area, a hard-surfaced area, sand piles, resilient surfaces (more than just dirt) under slides and swings; variety in degrees of shelter—full sunlit areas, natural shaded areas, roofed areas, wind sheltered areas; variety in equipment—simple steps, boxes, tunnels, simple climbing and swinging bars, more complex jungle gyms and a few (fewer than common practice) slides, swings, and merry-go-rounds; variety in plant materials—trees, shrubs, flowers; and variety in planting areas—some for gardening, some for growing plants, trees, and shrubs, and some for formal landscaping.

Second, playground spaces should be planned for *safety*. Many serious playground accidents are not accidental; they are the result of man-made hazards. Hazards can be reduced significantly on playgrounds by attention to such factors as sturdy equipment, treated surfaces under high equipment, spatial arrangements to avoid traffic congestion, safety zones, grade zones.

Purchasing Procedures

Let us assume that the initial stages of selecting equipment have been completed. Further, let us assume that there is a final approved list of equipment to be purchased and that reasonable budgeted funds have been allocated for this purpose.

At this point, direct consideration of educational processes should recede into the background and general good business practices should govern the final purchas-

ing process. It is most important, however, that all parties concerned in equipment selection—be they teachers, school board members, administrators, or architects—have a clear knowledge as to who will have the responsibility for calling the close decisions on specific equipment items and prices. No system of specifications, bidding, pricing, and ordering has been devised which removes the necessity for human evaluations or judgments.

Good business management of the purchasing process will be based upon: 1) complete physical accounting of equipment items; 2) complete fiscal accounting of allocated funds and actual disbursements; and 3) the establishment of an orderly and responsible flow process and time table for specification writing, sample examination, shop drawings, bid time, public bid opening, evaluation of bid prices and samples, issuing purchase orders, legal approval of contracts, filing of performance bonds, delivery schedules, inspection of goods on delivery, storage of delivered goods, installation inspections, operational tests, filing of product warranties, clearance of workmen's liens, filing of operation manuals, filing of records installation drawings, rejection and return of nonspecified or defective goods, filing service complaints, and paying suppliers.

When equipment has been delivered, is in operation, and has been accepted as school board property, the principal should again assume the major responsibility for it. He should be responsible for physical inventories and reporting and arranging for repairs and service. Even more importantly, he should continue to operate an in-service training program for his staff to help them understand the proper and best educational uses of the equipment. Frequently, thousands of dollars worth of equipment sits around school buildings, its educational possibilities untapped because the school staff does not recognize its full and proper uses.

A Final Word

Elementary school equipment can be a vital ingredient in transforming a barren schoolhouse into a stimulating school home for children. The selection of these educational tools will be based on sound educational thinking and practice. It will be based on a broad knowledge of the needs of children for proper growth and development, on an understanding of the criteria for functional equipment, and on an awareness of the broad range of choices in equipment available to educators.

Several sections of this article have been devoted to creating an awareness of the great revolution in the design of elementary school equipment during the past few years. These improvements have increased the chances for children to have more and more functional equipment to speed their learning.

In this burst of enthusiasm for modern, functional equipment and in our recognition of the great wealth of new knowledge about children and their characteristics, there may be value in reporting one small experiment with school equipment. In Copenhagen, Denmark, the city maintains a fascinating kind of equipment for children—a junk pile which includes a challenging collection of old wooden boxes, broken toys, and scrapped metal.[15]

Whether it be such a junkyard or the more traditional types of objects, it seems fair to conclude that school equipment will be sound when it represents a broad variety of flexible educational tools. Only then will elementary school equipment accommodate the range of individual differences among teachers and children and give freedom to meet the requirements of changing teaching techniques and future experimentation.

Safety IN THE SCHOOL PLANT

Stanley Abercrombie Norman Key Melvin E. Englehardt

STRUCTURAL safety in the design of the physical plant for a school is a basic responsibility of the architect. His professional qualifications necessarily include a knowledge of the properties of materials used in buildings, thus assuring their basic strength. The architect is bound to know and to follow the many provisions of local and state building codes regarding foundations, wall thickness, roof supports, electrical wiring, plumbing, heating equipment, placement and design of exit doors, fire-resistant qualities of interior finishing materials, and many comparable items.

All of these factors are involved in the safety built into the school. But there is no guarantee that a school built according to these and other accepted standards will be "a safe school" except, perhaps, in the sense that the basic structural components and the big equipment items (like heating, plumbing, and electrical installations) are sound.

First, beyond the standards written into various applicable building codes, there are numerous and important recommendations which, if followed, greatly enhance the safety of a school building. All building codes are not alike. In a sense, a local building code reflects the general awareness of the citizens and the specific ideas of public officials about those construction qualities believed necessary to provide *minimum* safety for the occupants. Communities differ, and the minimums in their building codes likewise differ. For example, and purposely using an item not common to school buildings, some cities require an elevator car to be equipped with its own doors in addition to the doors at each floor where the car stops. Other cities require no doors on elevator cars. Thus, the same degree of safety cannot be achieved everywhere just by following the minimum provisions of various building codes.

Second, requirements that exceed (or efforts to exceed) the minimum standards of a given building code often raise the all-important question of money. How far should a community go in constructing its school buildings to meet what might be termed maximum provisions for the safety of its occupants? Decisions providing for *maximum* safety may often (but not necessarily) increase the cost of construction.

Third, many architects do not know (and do not design school buildings in terms of) the principles of child growth and development which educators believe should be considered. This gap can be filled when provision is made in a com-

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munity for the study of these principles and the formulation of the necessary guidelines for the architect.

What kinds of questions are involved here? Some have to do with the philosophy of "reasonable protection for very young children, gradually replaced by education for safe living as the children grow older." Other questions relate to specific aspects of the physical plant, such as steps and stairs (including treads, risers, and handrails), recessed drinking fountains, and height and design of window sills for children of different age groups. A few questions might have to do with provisions for special groups of learners. In these and similar matters, it is important that the architect have the benefit of the knowledge and experience of principals and classroom teachers in designing new schools.

It is easy to see many pertinent relationships between the elements of the school building and the process of teaching and learning that goes on in the building. The factor of safety should be viewed in two ways: first, the *physical or environmental safety* as conceived, designed, and built into the school plant; second, the *behavioral safety* (freedom from accidents) that can be made to grow out of the physical plant and into the daily lives of the children and teachers. Because either of these two ways of viewing the safety factor may depend on, contribute to, or detract from the other, it is difficult to make a straightforward listing of items in each category. The following pages deal with some of the more important and universal aspects of safety in the school plant, and suggest the kinds of things that need to be planned for.

The School Site

The site selected for a school should be located away from nearby highways carrying high-speed (and noisy) traffic. It should also be clearly outside the take-off and landing paths of any nearby airport and away from railroad tracks. Since new highways and new airports, as well as new schools, are being planned and built each year, committees selecting school sites should check with their state highway department to learn about new expressway routes and with the Federal Aviation Agency regarding plans for new airport facilities that may be constructed in their area.

The site should be large enough to provide space for today's and tomorrow's needs—large play areas, parking area, bicycle racks, loading areas for both school buses and private cars, and pedestrian walks. Each of these facilities should be separate from the others to keep congestion and the possibility of accident at a minimum. The layout of loading areas should be such that no motor vehicle needs to be backed on the school grounds. Further, the flow of pedestrian and bicycle traffic should never be through parking areas or driveways used by motor vehicles. This is an extremely important point in planning a safe school plant.

The blending of a school with its site can greatly diminish the likelihood of accidents, especially those resulting from stumbles and falls. Walkways leading to and from each outside door should be as nearly as possible at the same level as the floor inside the doorway. The presence of steps—even a low one—at or near an outside door increases the chance of stumbles and falls.

Walkways or play areas adjacent to a wall of the building should be so designed and placed as to provide at least a six-foot overhead clearance of any projection, such as a steel casement window, that opens by swinging or tilting outward from the building. Where heavy snow may slide off the roof, it is well to have walkways placed at least 15 feet away from the sides of the building.

Play Areas

The school playgrounds and other play areas need to be located with care, having regard for easy access by children in different age groups, for the noise produced by groups at play while others are at work, and for separation of these areas from each other and from vehicular traffic.

A level surface, except for drainage needs, is best for playgrounds where children are involved in organized games or group activities. The sections of playgrounds intended for particular types of activities should be planned in a way to minimize interference of one group with another.

There are many different opinions as to what surfacing materials should be used for playgrounds, especially near and under play apparatus. One of the more desirable materials—grass—cannot be maintained and soon becomes rough and hard. A widely-used material is a bituminous mix or "blacktop" which provides an all-weather surface. Besides absorbing heat, such a surface material causes snow to melt more rapidly and water to evaporate more quickly than some other materials. It is relatively resilient and injuries incurred on it are cleaner and easier to treat than those incurred on concrete or bare ground.

Under play apparatus, tanbark or sand will help to break the impact of a fall. Sand is difficult to keep in soft condition and it presents a problem when tracked into the school by hundreds of feet. Experiments are being made with special rubber and other types of mats or pads under play apparatus in an effort to develop a material that will minimize injuries from falls and, at the same time, be inexpensive, durable, and easy to maintain. However, the question of what material to use has no single answer for all schools. It depends on availability, climatic conditions, cost, cleanliness, and the desires of the community.

Freedom from accidents in play areas and on apparatus is by no means assured just by careful selection of surfacing materials and the wise placement of play apparatus. Here, as in other parts of the school program, children have a continuing need for purposeful learning experiences in safety as well as for appropriate guidance and supervision.

Building Interior

What should be said about the inside of a school as regards safety? In the planning and construction stages, consideration should be given to such obviously safety-related items as:

- walkway surfaces. The fewer steps and stairs, the better. Gradual ramps are preferable to steps where space permits.
- stairways. Measurements of treads and risers should conform to acceptable standards and be uniform throughout the building. Handrails—not too high for young children—should be installed on both sides of stairways and in the middle, as well, on wide stairways.
- drinking fountains. They should be recessed flush with the wall.
- interior doors. Each one should be planned so as to swing in a convenient and least hazardous direction.
- casement windows. Where part of a window swings or tilts inward into the classroom, an overhead clearance of at least six feet is desirable.

Among the less obvious but nevertheless consequential factors from a safety standpoint, the following should be included in both new and not-new school buildings:

- adequate lighting of corridors, especially near and on stairways and in

the vicinity of drinking fountains and doorways.

- good trash receptacles—metal waste baskets in classrooms and offices, and metal containers with metal covers for bulk collections of trash.
- rounded corners and edges wherever possible on chairs, tables, desks, cabinets, and other furniture.
- hand-operated alarm system for use in the event of electric power failure. A series of bells hooked by wire or cable to a central location in or near the principal's office is one such alternative system.
- properly planned and adequate storage facilities—for books, tools, and other instructional supplies; for folding chairs and other furniture; for maintenance equipment and cleaning supplies. *All* flammable liquids in schools should be kept in approved types of metal-covered containers.
- arrangements specially planned for the facilities and equipment in the stage area of the auditorium, the cafeteria, and the special purpose or special activity rooms and areas. Points for review and possible revision include minimum or *no* use of steps and stairs, solidly-built risers or tiered platforms for music group activities, storage for stage properties, locked covers or doors on electric control panels.

Much more could be said about other major and minor items if space permitted. There is, however, another point of utmost importance upon which the safety of all items and areas inside the building depends. That is *maintenance*. A school can be safe today and hazardous tomorrow if maintenance is slipshod. Walkway surfaces become worn or slippery, a chair rung breaks, a handrail comes loose, trash accumulates in dangerous quantities—or any one of dozens of other conditions develops as a normal result of the comings and goings of children and staff over a period of time.

Three things can be suggested that will help keep a school in safe condition. 1) Maintenance needs to be a regular activity, planned and carried out on a systematic basis. 2) Maintenance is a responsibility not only of the custodians and building engineers but also of the principal, classroom teachers, all other adult employees, *and* the children. 3) Maintenance of a safe school environment provides an ever-present point of departure for teaching children the basic understandings and practices of safe living and of good citizenship: courtesy, thoughtfulness of others, "good housekeeping," and prompt action to remedy (or at least report the presence of) hazardous conditions observed.

Maintenance of safe conditions in any school is the business of everybody in that school.

Fire Prevention and Protection

In addition to wise planning and efficient maintenance, some of the basic measures that protect people from fire include:

- automatic sprinkler system, said by fire protection engineers to be the surest means of keeping fires small
- use of fire-resistive building materials, furnishings, draperies, and paints, and non-combustible interior finishes and acoustical treatments
- adequate and well-located exits equipped with anti-panic opening devices (often called "panic hardware")
- automatic alarm system, including an alternative means of sounding the alarm in case of electric power failure

Beyond these kinds of basic measures, what is needed for fire safety in schools?

The one most important factor here is the behavior of children. In a fire emergency, children, like adults, tend to behave according to what they know, what they have practiced, and what they may fear.

It is idle to try to separate environment from human behavior and, therefore, quite useless to plan only for the protective measures that can be built or rebuilt into schools. The children and *all* of the adults (principal, classroom teachers, substitute teachers, custodians, cafeteria and other employees) need to know thoroughly the procedures that have been planned for certain emergencies. Further, they need to have periodic opportunities to practice these procedures and to review how well they work out in each practice drill.

Then, to emphasize the indisputable importance of relating human behavior to the physical environment, children need opportunities throughout every year they are in school to think about what they will do in case of fire: what alarm may be given, what exit they should use, what to do if that exit is blocked, where to assemble outside the building. Together with the teacher, they need to think about these things and to raise questions, discuss alternatives, and appraise their own behavior following each practice drill. This is an important aspect of safety education—coming to understand the consequences of their own actions in real or simulated emergency situations.

Beyond the emergency procedure phase of fire safety, there is the even more fundamental need for learning experiences related to the nature of fire, its uses, its dangers, and the combinations of factors that produce fire and keep fire under control. But here we are in the area of child growth and development instead of safety in the school plant. Or can we really talk about the one in any meaningful way without relating it to the other?

Civil Defense

The planned precautionary measures recommended for meeting pre- and post-emergency needs of the civilian population in case of enemy attack have changed several times as the potential devastation effects of nuclear weapons have increased. The relatively simple precaution of "duck and cover," while quite protective against atomic blasts and radiation, would be effective only in the fringe areas miles away from the target center in the case of more recent thermonuclear weapons. These changes in the destructive power of weapons, plus unknown future possibilities, have made it difficult and exceedingly frustrating for communities to feel confident in developing plans of protection.

Besides disasters stemming from military attacks, emergency situations of great proportions are occasionally brought about by tornadoes, floods, earthquakes, hurricanes, blizzards, and explosions followed by fire. Against these types of disasters, intelligent actions can be planned, discussed, and practiced by school populations for possible use in an emergency. And preparedness for these kinds of emergencies may have important application for school and community populations in the event of enemy attack.

How much do we know now that can guide us in the right direction in preparing to cope with emergencies of disaster proportions? It has been demonstrated in more than one instance that the "duck and cover" procedure saves lives and prevents injuries if children and others can manage to duck and cover before a tornado strikes. This procedure—using specially-constructed shelter facilities wherever they are available—probably should be thought about and practiced so that people will tend to take this measure of protection if advance warning of a tornado or other disaster is given in sufficient time.

Evacuation of civilian populations from cities, including especially school children, has been tried out in a number of communities. As a result of these experiments, it is presumed that evacuation can be included as another possible protective measure if advance warning of the need to evacuate an area is received in enough time in advance.

Perhaps the best thing that can be said here about civil defense protection for schools is that children should have the opportunity of learning about our modern world—both its good and bad aspects—in an atmosphere calculated to produce as few tensions as possible. Principals should work closely with classroom teachers in planning these learning experiences, and both groups should be alert to developments and plans emanating from the federal government, particularly from the Office of Civil and Defense Mobilization (formerly the Federal Civil Defense Administration).

Daily School Routine

Children (and adults, too) come and go during the typical day according to the pattern of the school program and the arrangement of the classrooms, restrooms, cafeteria, playground, auditorium, and special activity rooms. What this daily routine is likely to be in a school not yet built can be closely approximated in advance if plans are based on past experience. The well-planned school promotes the easy coming and going of people in an atmosphere—purposely developed and maintained by principal, staff, and pupils—free of the need for strict regimentation. This kind of atmosphere in the typical modern school is conducive to safe movements and safe activities both by groups of children and adults and by individuals.

The daily school routine needs to be looked at from time to time, because changes in numbers of children and in the school program introduce new influences that may create congestion, hurry, confusion, and indecision—all of which are accident-breeding.

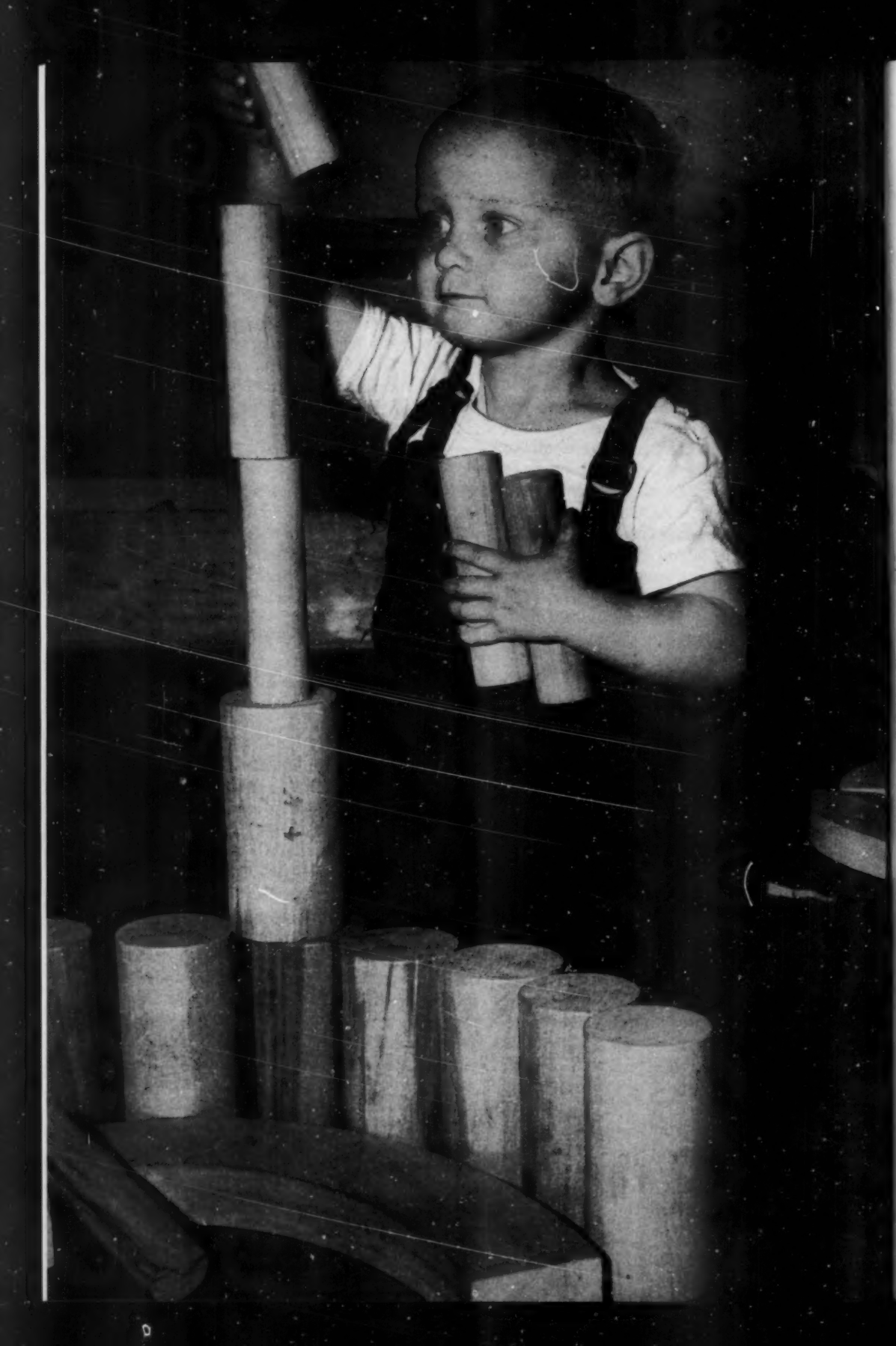
Pupil Understandings

Most of what one sees and hears about safety in the school plant concerns purely physical factors and adult responsibilities and practices. Unfortunately, too little is said and done about the all-important matter of the teaching and learning of safety.

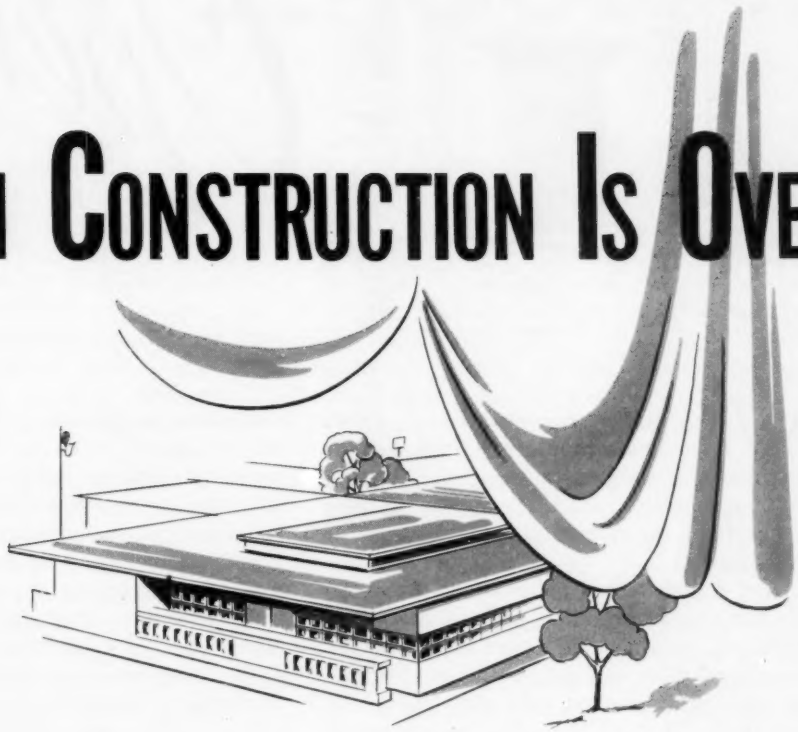
No school can fulfill its capabilities or achieve its high purposes unless the children themselves understand safe living. The development of this understanding begins as soon as children enter school and continues each year thereafter throughout the educational program.

It is the business of safety education to promote success and satisfaction, to substitute good adventures for bad ones, and thus to make possible human productivity and the enjoyment of living without those unplanned and tragic interruptions we call accidents.

The school plant and all that goes on in and around it offer rich substance for teaching safe living. No one would argue against building (or rebuilding) a high degree of environmental safety into the school itself. But why rest the case there when so much of safe living depends upon knowing how to make wise use of a well-planned school environment? Knowledge about the school plant, about the whys and wherefores of its thousand and one protective features, leads to understanding and appreciation of the benefits of safe living. And on this understanding and appreciation are built desirable attitudes which translate easily into safe practices in the doing of the countless activities that comprise the teaching and learning program of todays' elementary school.



When Construction Is Over



The end of construction is the beginning of a school—the time when bricks and steel are transformed into an active learning environment. The school must be opened, a program launched, people oriented. And as the months go by, it must be maintained and adapted to changing requirements. Only if these things are done well will the new school fulfill its function as a design for learning.

Opening

Edwin A. Juckett

WHEN taken for granted or as an anti-climax to many difficult months of planning and construction, the opening of a new school usually consists of little more than the actual physical process of moving in.

Yet a new school plant offers many opportunities to establish policies and practices that can provide better education for boys and girls during the entire lifetime of the building. The fact that the school has been planned for the future rather than the past means that a great deal of thought must be given to planning the use of the new educational tool. The opening of a new schoolhouse should be carefully planned well in advance of the moving day.

Need for Appreciation

Probably the key point in planning for the opening of a new school is the development of *appreciation*—appreciation for the many features of the building that create a better learning environment.

Classroom teachers, the principal, and others should learn to appreciate a fine building, just as other professionals or artisans learn to appreciate their tools. In the hands of an accomplished violinist, a Stradivarius would be respected as a fine musical instrument; in the hands of an untrained and unappreciative person, it would be just another violin. For a skilled craftsman, an expensive, well-made micrometer would be a joy to behold and to use in the creation of an intricate machined part. Likewise, the bowman who has spent hour after hour through the long winter carving and preparing a bow for use in the field would have a much greater appreciation for the weapon than someone who merely received a bow as a present.

A new school plant, with its built-in facilities for the modern education of boys and girls, calls upon us to develop a feeling of appreciation among the many different persons who use the building. The school administration, teachers, children, parents, and many others should understand the educational functions of the school and become aware of how its facilities have been planned with these functions in mind.

Edwin A. Juckett is District Principal, Smithtown, New York.

A NEW SCHOOL

This can be done by careful planning and involvement of appropriate groups at the right time. Specific illustrations will be given from the plans developed in Smithtown and Hyde Park, New York, for opening new schools. These plans were worked out by democratic procedures within a supervisory cabinet consisting of the building principals and chief school administrator. The plans were used with seven building projects—five elementary and two secondary school occupations.

Additional resources in the planning stage included: 1) outside educational consultants; 2) the school architects; 3) classroom teachers; 4) school specialists, such as the cafeteria dietitian, the superintendent of buildings and grounds, and the head custodian; 5) special area workers such as the school nurse; and 6) resource teachers in such fields as music, art, and physical education.

The More the Merrier

In opening a new school, "the more the merrier," both in planning and furnishing the building. The more teachers and non-teaching employees who understand the purposes of the plant and the ways the building has been designed to implement them, the greater the appreciation for the building when it is occupied.

Usually, those teachers who have had a voice in the planning stages are most likely to utilize the building effectively when the occupation takes place. For instance, the teacher who has suggested that a dispersed type of architecture would provide a more informal, relaxed atmosphere for learning would have an appreciation of the advantages of a cluster type building. On the other hand, the teacher who did not have a voice in the planning will probably need to be convinced of the purpose and value of this design. Otherwise, he may think of the school in terms of "cold walks," "putting on and taking off clothing," and "difficulty in getting to the nurse's office." Very often, the point of view makes the difference between a "good building" or a "bad building."

Although planning the building occurs two or three years beforehand, the way in which teachers, children, and others are involved has a vital effect on the success of opening day.

Many individuals and groups need orientation to the school plant. They include district administrators, building principals, supervisors, coordinators, teachers (including itinerants who may work in more than one building), resource teachers, nurse-teachers, hygienists, custodians, office workers, members of the board of education, kitchen workers, public groups such as the PTA, service clubs, out-of-school youth, community organizations, and the press, and, of course, the children who will occupy the building.

When does the work of orienting these many different groups start? Of course, the answer is "as soon as possible." Obviously, the teachers would start during the planning stage in areas in which they have the training and experience to give advice. The children, however, would not be brought into the orientation program until the physical construction of the

building is at such a point that they can easily visualize the design and see how they fit into it.

One principal in Smithtown went to great lengths to orient pupils before they moved into their new building. Tours, explanations, and a mimeographed bulletin covered the ground for both children and parents. Everyone agreed that this work was priceless in insuring a smooth occupation.

The parents should be brought in at a point where they can see the purposefulness of the building's features. It is not wise to bring them in when they can see only such discouraging sights as muddy grounds, half-completed classroom walls, and electrical wires protruding from panel boxes. Avoid, here, the remark, "What a mess!"

Selecting Personnel

Another important step in opening a new building has to do with selecting the staff of the new plant. In this age of changing attendance areas due to community growth and population shifts, it is often necessary to divide faculties between the old and new building. These choices are not easy to make. For this reason, a pre-established set of criteria for placement of faculty members has advantages. It contributes to a balance of staff, helps to avoid hurt feelings, and promotes good morale.

In a high school situation in one school district, the following guidelines for faculty placement were developed.

Balance is important. Each school faculty should have experienced and inexperienced teachers; both male and female teachers; both old and new teachers (in terms of local experience).

Compatability is important. Will each group work well together? Will they enjoy working together? Will they be effective as a team?

Competence, ability, skills, and certification are important. There must be staff for special subject areas and people with interest in special activity programs.

Capacity for individual growth is important. Each member of the faculty should be willing to learn, to experiment, to accept change, and to adapt to new situations.

These guidelines were given to all teachers. They were asked to think them over, talk about them informally, and then make a personal choice on moving to the new building or staying in the old one. After the choices were made, it was necessary for the school administration to ask only two of fifty teachers to reconsider. In an elementary school in the same district, the administration was able to go along with 100 percent of the teachers' personal choices.

Another way to help insure a smooth opening is to appoint key personnel months in advance of the occupation. This would include the principal, office secretary, and head custodian. An example from Hyde Park illustrates this point. The principal of one new elementary school was appointed seven months in advance of the occupation. He used this time to get acquainted with the building and the children, teachers, and other employees who would be in it. Although the teachers were working in another building, arrangements were made so they could work with the new principal on school policies, schedules, transportation, and so forth.

The office secretary and the head custodian are personnel who need to know a great deal about the new building. A few dollars spent in additional salaries to place these people on the job early will pay big dividends.

Preliminary Staff Planning

When the staff is selected well in advance, it becomes possible to do some ad-

vance planning and to begin building an effective working team.

In Hyde Park, New York, the faculty of a new junior high school took advantage of the fact that they were on a half-day session. In cooperation with a nearby college, a four-hour workshop course was held once a week throughout the year prior to moving into the new building. The teachers participated in a program where they worked out curriculum routines, reporting systems, work schedules, and dozens of other items involved in the occupation of a building. In an elementary school in the same district, class sections were arranged so that the children and teachers who would be moving into the new building had seven months—from September to March—to work together before going into the new environment.

Before occupying the school, it is important that teachers and other employees become acquainted with the facilities in the new building and how they will use them. Specific problems that will need consideration will vary from district to district. Despite these local variations, there are many common points which will arise and which can be anticipated before the new school is opened. Here are a few of them.

How do we ventilate the room? use the shades? arrange for changes in room temperature? care for the floors? care for the chalkboards and bulletin boards? use the artificial lights? lock and unlock the doors? care for the room key? use the sink and counter work space?

Where do we store things—textbooks, workbooks, paints, crayons, scissors, brushes, different sizes and types of paper, art work, library books, thumb tacks, cellophane tape, class registers, plan books, student papers and special projects, instructional aids, audio-visual materials, and so forth?

What do we do with living things—aquarium, terrarium, and plants?

What rules must be followed on the use of thumb tacks, masking tape, cellophane tape, nails, or other methods for fastening items to walls and other surfaces of the classroom?

What type of activity may create a noise transfer problem to other areas of the building? What do we do through scheduling to avoid such noise troubles?

In what part of the room is it best to place a screen for showing slides or movies?

What are the possibilities for desk and chair arrangements to provide a good learning environment?

Are there any "new" features of the building which we need to understand? For instance, dark window glass. Who will explain the importance of good sight conditions in the classroom? Who will explain the 3-1 and 10-1 ratios of brightness within the child's vision area? Teachers should know that the dark glass is used for a specific health purpose and not just for looks or novelty. From such explanations comes appreciation.

Are there rules on common usage of rooms and equipment for adult education programs?

And, let us not forget to mention storage and its effective use. Because of high costs, most new buildings squeeze every available square foot of space into the instructional areas. This practice, in turn, may cut down on storage rooms as such. However, the furnishing of a modern elementary classroom usually provides storage areas for instructional materials. Such situations must be understood by teachers before they move in. This will prevent the criticism that "there's no storage room in this school."

The Shakedown

Part of the appreciation to be developed for a new building is an understanding that there is always a shakedown period to

contend with. Call it "bugs to work out," "faulty workmanship," or "gimmicks to be understood," there are literally hundreds of items that may temporarily be out of adjustment. Inspection and adjustment is necessary for light switches, ventilating fans, doorknobs, and dozens of other items. Consider the miles of wiring, the hundreds of motors, the thousands of parts, all coupled with thousands of manhours of human work, and it becomes obvious that a shakedown period is part of the complex job of opening a new elementary school.

Or, another way of putting it, our own home never quite gets finished to our liking. There's always one more shelf to put up, one more surface to paint. How true this is with the complex physical structure that is the modern schoolhouse!

To prevent irritations among teachers and other employees, it is important to develop an appreciation for the fact that there will be many adjustments to make—probably for months.

Learning About the Plant

The architect, knowing that any new building will have its shakedown period, will want to protect his own interests by aiding the school administration plan for proper use of the building and orientation to it. Often the architect is too busy to give much time to this job. An excellent complement to his services is a written brochure on the use of special equipment in the building. Such a brochure can be given to teachers to use as a reference. The subject matter can be carefully selected by the principal and architect according to the local needs of teachers in the specific building to be occupied.

The architect, along with prime contractors, can also help the custodian, buildings and ground personnel, and cafeteria workers. Most construction contracts provide for instruction of personnel in the use of highly specialized equipment. It is essential that school districts avail themselves of these services. Contractors and manufacturers can furnish books or bulletins of instruction for equipment such as boilers, but in addition there is need for personal word-of-mouth instruction. Most custodians are not engineers; so a "school of instruction" should be part of the planning for a new building.

Much can be learned also about a new building by visiting the plant when it is under construction or a similar school already in operation. For example, a group of teachers looking forward to using an "enlarged corridor" or common work space in a new building might visit a school where such a space is in use. They would then see in operation many uses for such an area.

One service not always familiar to the school staff is the lunchroom or cafeteria. For handling this facility, much planning is necessary: 1) planning the kitchen and

specialized equipment with the help of the dietitian; 2) integrating the hot lunch program with the teaching program. The dietitian can help the whole staff understand how the hot lunch program fits into the general instructional objectives of the school.

Plans must be made to acquaint resource teachers and itinerant personnel with the new building. These people need to know what facilities are available to the classroom teachers and whether the school has been designed with the self-contained classroom in mind. Storage of materials, length of periods, and scheduling are some of the problems that will arise and need to be answered prior to the occupation of the building. Likewise, provisions for such special areas as practice rooms for small group music lessons, stage and playroom space, and locker and shower facilities need to be considered. Thus, resource teachers, as well as regular classroom teachers, need to be called in early to share in the planning and orientation programs.

There are also other special areas in the building that need clarification prior to occupation. For example, the new school may have a coeducational faculty room. Agreements must be reached by school administrators, men teachers, and women teachers on the use and care of this important building space. The informal organization of a school faculty can develop plans for the use of this room. Well managed, the room can build communication and morale in the school.

"Feel-Touch-Do-Use" Method

It must be kept in mind that brochures alone will not do. It is much more effective to use the "feel-touch-do-use" method rather than to depend on a booklet that may be filed in the desk drawer and forgotten. For example, the teacher who uses the "feel-touch-do-use" method in room ventilation will have better appreciation of this important item than a coworker who merely listens to a lecture. The teacher who actually closes an exit door by turning the proper key on the door-brake will have better appreciation of the process than if he reads about it in a bulletin. These are simple examples of simple processes. But multiply them by a hundred and the importance of the task becomes more apparent. Where possible, employ the "feel-touch-do-use" technique.

The use of this technique depends to a great extent on timing. It would indeed be fortunate if all faculties and their assigned children could have the opportunity for a "dry run" of a new building before actually occupying it. Although this is not always possible, school administrators who recognize its importance will make every effort to have the building completed on a schedule that allows for the "dry run."

Appreciation—the Key

Appreciation of a new building can be built by participation. First, we need to identify the key groups and individuals who should be involved. Then, we should proceed to organizing channels for their active involvement in getting ready for the opening of a new school.

Appreciation is the key word for a smooth and successful occupation of a new school building. And, as is true with other school jobs, the principal must have a key role. He needs to know many facts about the new plant and he must be able to pass along his knowledge to many others. Fundamental to communication is rapport. The principal seeks to build effective teamwork with good rapport during the many months prior to occupation. Leadership and staff rapport, combined with knowledge of the new plant, will tip the scales in favor of a smooth and effective occupation of that new school.

MAINTENANCE of

H. M. Arndt

A modern school plant represents a substantial investment. Into it have been poured months, more likely years, of planning and probably hundreds of thousands of dollars. Once completed, the new school must be maintained—to protect both the community's investment and the quality of the learning program.

A dilapidated building or unrepaired equipment is a standing invitation to vandalism. Property which is kept in good condition becomes an incentive for children to cooperate in keeping the school plant in respectable condition. Then, too, proper maintenance is necessary for the safety of everyone who uses the school. This is of prime importance. Correct maintenance can also do much to forestall the day when major repairs or structural alterations will have to be made and help

CEof the SCHOOL PLANT

to avoid time lost from school while heating, plumbing, or similar equipment is restored to service after a major breakdown has occurred.

All parts of the school plant are continually depreciating, starting from the day the building is completed.

Depreciation is the result of the following four factors: 1) wear and tear of usage; 2) physical decay; 3) obsolescence; and 4) accidents due to defective materials or negligence. Maintenance must counteract, insofar as possible, the effects of depreciation.

Maintenance is the process of keeping the school site, buildings, and equipment in as near their original state of repair as possible.

Who Is Responsible?

It is the responsibility of the school community to retard depreciation as much as possible. Principals, teachers, children, and parents have a role in this process, as well as the custodian and members of the maintenance crew. Children should be taught respect for school property. They should be taught to appreciate the beauty and artistic design of their school building and its setting. When they do, they will take pride in keeping it attractive and will not be prone to defacement or vandalism.

The school principal, teachers, children, and custodian can be invaluable to the maintenance department in helping to spot needed repairs. As daily users of the building, they are likely to be the first to notice minor defects which, if not caught promptly, may later require major repairs.

The custodian of a school will ordinarily take care of some minor maintenance jobs. But his other duties will prevent him from doing very much repair work while school is in session. Also, the custodian may not be capable of performing jobs requiring specialized skills.

In some instances, consultants from supply and equipment companies and from state departments of education can assist and advise on maintenance problems.

All of these people have an opportunity to help maintain the school building. But to the maintenance crew will fall much of the job of seeing that repairs are properly made and providing the specialized skills with which to make them. The exact manner in which the maintenance function is organized will vary with school systems. A small system may very well find it impractical to undertake the kind of comprehensive operation described here. No single plan will suffice for all school systems.

The Maintenance Crew

The size and composition of the maintenance crew will be determined by the size of the school system, by the funds available, and by the scope of the crew's responsibility for repairs. These factors will also determine the number and qualifications of the personnel who are employed for the crew.

The selection of qualified personnel is important to the efficient operation of the maintenance crew. The maintenance

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superintendent should have a general knowledge of carpentry, plumbing, cabinet-making, heating, glazing, locksmithing, and other trades. In order to expedite repairs, he must know the layout of each school plant or have blueprints.

To assist him, the maintenance superintendent should have a corps of workers who are specialists in the many areas of work mentioned above. When an emergency arises or when a particular job must be done quickly, these men must be willing and able to undertake the work as the situation demands. In addition, they should be available for emergency calls—for instance, repairing a heating plant at night or over a weekend. This is important for it may make the difference between the school's being able to operate on its regular schedule or having to be closed for a day or even more. The members of the maintenance crew should be of good character and capable of working without close supervision.

Since the maintenance crew may need additional personnel during the summer months, it would be well to consider school custodians for this summer employment. Summer work can be good training for a custodian and will help him to better perform his duties during the regular school year. In large school buildings, of course, the custodian can be fully employed in his own school during the summer.

Repair Requests

The school principal must be familiar with procedures for requesting repairs in his building. Methods of reporting needed repairs are not the same in all school systems. But we can agree that requests for repairs should be made in writing. Duplicate copies of the request should be made by the one who makes the report, such as the school principal or the maintenance man who discovers the need. Emergency repair should not require a written request but should be reported in the most expedient manner. Requests for repair should go to the maintenance superintendent for handling and processing, unless it is some small item which can be taken care of by a "roving" maintenance man.

On his regular visits to each school, the roving maintenance man should find, in a specific location, two copies of each of the repair requests needing his attention. The maintenance superintendent or similar person should note on the request what has been done or should be done concerning this work. One copy of the request should be placed in the central maintenance files and another should be placed at the disposal of the school principal. This plan will help to keep all parties informed as to the status of the work and will be a record of materials used on a particular job.

Requests for major repairs or renovations should be submitted to the maintenance superintendent in the same way as other requests. In consultation with the superintendent of schools, he should decide what work can be done with available funds or should be provided for in the next year's budget. Where funds are limited, requests will have to be handled in order of priority. Some will be classified as "necessary" and others, as "desirable."

Major repairs or renovations should be investigated carefully before any decision is made on them. A few items may well be eliminated as a result of this investigation while others will be approved, subject to budgeting.

Supply Requests

Requests for maintenance supplies to be used by the custodian should be handled in much the same way. One copy of the request should be made for the stockroom's files and another for the school. The school's copy should be returned to the school with the supplies when they

are delivered. The stockroom copy helps the maintenance department keep up the inventory which will, in turn, facilitate the reordering of supplies.

With few exceptions, supplies should be disbursed at the school system's supply rooms and only to authorized personnel with authentic requisitions. The person receiving the supplies should sign for them to avoid later controversies.

Maintenance supplies or new equipment should be requisitioned in a similar manner. This system provides a record both of the materials obtained and the place where they were used. The shop can keep its inventory up to date, materials can be reordered immediately when they are needed, and the cost can be charged to the proper school and account.

This system of requisitioning supplies and equipment requires considerable bookkeeping, but will be well worth it.

Using a Checklist

An inspection should be made each year by the maintenance department, prior to the closing of school in the spring. This procedure enables principals, teachers, children, and the school custodian to note and report their needs. Their familiarity with the school plant often helps to identify needed changes or repairs that could be overlooked by someone less well acquainted with the building. Toward the end of the year, the principal and custodian should make a careful inspection of the school plant. The involvement of teachers and children in this process, wherever possible, helps to make them more aware of their part in caring for the building and grounds. At the same time, the maintenance department should also make a thorough inspection.

The following checklist suggests some of the many points which should be included in this annual inspection.

Carpentry: Inspection of windows, window sashes, window sills, doors, locks, door checks, joists, sills, sash cords, cabinets, shelving, floors, plaster, roof, cement work, chalkboards, step treads, desks, and fire extinguishers.

Plumbing and heating: Inspection of flush valves, commodes, urinals, lavatories, traps in drain lines, drinking fountains, gate valves, globe valves, radiators (traps, valves, and air vents), pumps, boiler for heating (flues, grates, water feeder, low-water cutoff, fire controls, gauge glasses, pet-cocks, boiler return pump, circulating motors, auger, thermostat, aquatats, stoker), hot water tanks, stoves, septic tank (if used), pneumatic tanks (inside and out), and the water supply.

Painting: Inspection of the building's exterior, classrooms, desks, cabinets, radiators, workrooms, cafeteria, auditorium, offices, library, corridors, stair wells, teachers' lounge, and rest rooms.

Electrical: Inspection of all types of motors, wiring, light fixtures, electrical controls, panels, switches, fuses, duplex outlets, public address systems, bells, electric clocks, electric stoves, fans, floor polishers, automatic controls, exit lights, plugs, and extension cords.

Maintaining the Roof

Inspection of the roof is an important item. Repairs, made before the roof actually leaks, can prevent extensive damage to plaster, paint, and equipment. An ounce of prevention is sometimes worth a pound of cure. Immediate attention should be given to a roof reported in need of repair. This may extend the life of the roof for several years. With regular inspection, a worn-out roof can be located and plans made for replacing it during the summer vacation.

Metal roofs should be inspected twice yearly and renailed where necessary. They should be sprayed at regular intervals—usually every three years—depend-

ing upon the age of the roof and other factors. Other roofs should be checked in detail, opening and repairing air pockets when they are found. Such roofs need to be recoated every five years.

Trouble often appears at points where the roof is fitted against walls and chimneys. Such joints should be coated annually to prevent leaks. Flashings in this area also need to be examined carefully and repaired.

Heating and Plumbing

Keeping school heating and plumbing equipment operational is a major job. A roving heating and plumbing truck can be used in larger school systems to make periodic visits to schools to check equipment. The heating and plumbing man should oil and grease motors about four times a year and check to see if clinkers in furnaces have accumulated so as to damage working parts of the stoker or furnace. It is his responsibility to check the boiler flues to see that the custodian is keeping them clean. Flues, fire box, and stoker should be thoroughly oiled each year after school closes in the spring.

Five rules should be followed in discovering difficulties in a hot water heating system. They are: 1) check for blown fuses; 2) check for air in heating lines; 3) check for burned-out circulating motors; 4) check water pressure on the boiler; and 5) check operation of thermostats.

Electrical Connections

The electrical crew should assume responsibility for making sure that electrical appraratus on the boiler functions properly. They should replace defective starters, ballast, toggle switches, fuses and plugs; replace burned-out heating elements in hot water heaters; repair and adjust the inner communication system; replace worn extension cords; make sure that wires, appliances, and tools—especially those in damp locations—meet code requirements. All permanent installations and motors must be grounded.

The layout of the electrical systems in each school should be readily available to the electrical crew. Panels should have complete directories of circuits served. Switches and motors need to be labeled to show their respective panels. All exit lights should be equipped with red globes or covers.

Painting

The painting crew has an important function in keeping the building attractive, inside and out. Proper painting will preserve and extend the useful life of a school building.

Classrooms, corridors, and toilets especially should be kept attractive, inviting, and free of odors. Pastel colors on the walls, properly blended, can make an attractive setting for study in the classroom. When stock colors are used, necessary repairs can be made with little loss of time due to the need to match colors. Contrasting colors on various walls will brighten a room.

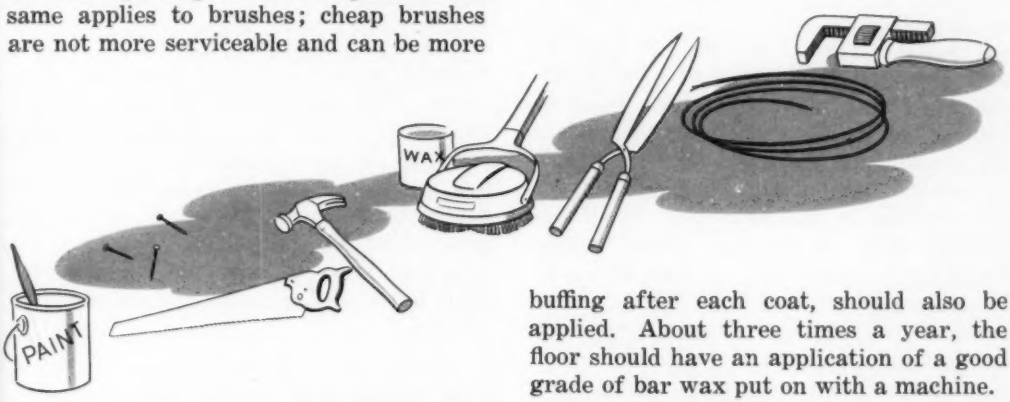
When cabinets in the classroom are painted in several harmonizing pastel colors, they add to the attractiveness of the room. Chair rails and woodwork should be covered with paint which harmonizes but is darker than the wall colors. (They will not show soil readily.)

All painting of classrooms should be done when the children are not attending school. The auditorium and rooms not used frequently can be painted during the school year. This permits the painting crew to have inside work during periods of bad weather.

The trim on the outside of the building (if wood) should be painted every three years in most climates, excluding window

sills and doors, which should be painted every year. Colors on doors make the building more attractive and reduce the obvious soil and marks. Gutters and downspouts, when painted in contrasting colors with the trim work, can contribute to the beauty of the plant.

Adequate equipment is necessary for extensive painting operations. Only the best grades of paints should be used. In the final analysis, this will be less expensive than putting on inferior paints. The same applies to brushes; cheap brushes are not more serviceable and can be more expensive in the final accounting. Painters should be held responsible for the brushes which are issued to them.



Care of Floors

Worn and unkept floors can ruin the appearance of an otherwise attractive and well-kept building or room. The attitude of teachers and pupils is most important in caring for and preserving floors. The teacher who is particular about the appearance of the floor in his room will be repaid by dividends of attractiveness.

Wooden floors can be kept attractive and useful for many years. They are more easily cleaned when kept in good condition. The practice of oiling floors is now obsolete; they should be sanded, sealed, and finished with a good grade of sealer. Three applications of sealer are followed by three applications of nonslip wax before the floor is buffed. Such floors should be kept clean—as free of grit and dust as possible. They should be gone over daily with a treated dust mop. The floor should be damp mopped and rewaxed and buffed monthly. This waxing will preserve the finish.

Asphalt tile floors should be cleaned thoroughly before an application of wax. Three coats of water emulsion wax, with buffing after each coat, should also be applied. About three times a year, the floor should have an application of a good grade of bar wax put on with a machine.

To maintain floors in the best possible condition, they should be stripped of all wax annually and rewaxed as described above. Floors in daily use (both wooden and tile) need some daily maintenance.

Stripping and rewaxing of floors should be done during the summer vacation, as a rule, but periodic waxing during the school term should be done by the custodian who can learn this work with the summer maintenance crew.

The maintenance superintendent works closely with the superintendent of schools in planning and carrying out the repair and conditioning of buildings. In addition, those who use the building daily—the principal, teachers, and children—must be alert to the ways in which they can help to keep their school in good condition and to report when repairs are needed. Only with such cooperation can school buildings be properly maintained.

The Schools We Already Have

Marion Jordan
David M. Jackson

ALMOST every community in America faces both a shortage of school housing and a shortage of school building funds. The children of the world's "richest" nation are being educated for life in the second half of the twentieth century and beyond in buildings that are functionally and, in far too many places, structurally obsolescent. In 1958, well over 10 million American school children were in school buildings more than 30 years old. Ten to twelve percent of the total number of school children were in buildings *over 50 years old.*

Industry, commerce, and defense maintain standards of excellence in modern plants, using the latest creations of science, technology, and art. Education, on the other hand, strives for both quality and quantity while housed in crowded plants that were functionally outdated at the time they were constructed. Has the technological revolution bypassed education?

Wars, depressions, antique tax structures, prejudice, apathy, tax revolts disguised as economy crusades, opposition to modern educational theory—all self-perpetuating where educational standards are low—have made America's investment in school buildings less than adequate. Educators face the difficult but inescapable task of adapting existing facilities for an educational program that has the scope, content, organization, and flexibility to meet the needs of all the children of all the people. This chapter tells something of how the job is being done in various communities around the country.

New Schools and Obsolescence

Many new schools offer good examples of how modern function can be implemented in design, structure, and equipment. In our times, however, changes occur at such an accelerated pace that the curriculum demands to be placed on these buildings for a span of 50 or more years can hardly be anticipated. With the advent of stratovision, television program material can be transmitted from twelve aircraft to all parts of the United States. Thus, twelve teachers could theoretically teach all school children at one time. This example suggests something of the extensive adaptations which will have to be made if schools are to serve the modern "Explorer" age. These changes will continue to challenge the creative leadership and talents of superintendents, principals, teachers, architects, parents, and other members of the lay community.

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If increased demands for flexibility and adaptability are to be made on the best of our new schools, what can be said of the present and projected inadequacies of thousands of new schools that were or are being built merely for the purpose of relieving pressures of classroom shortages? The tragic truth is, many schools have recently been built—and in growing numbers will continue to be built—with little regard for a bold and effective concept of quality in educational function. The cry is for more seats and sameness, for bargain basement economy, for a nineteenth century subject-centered and authoritarian philosophy, for methods based on a Democritus ontology, for larger enrollments in smaller classrooms, for letting "society" (something apart from schools, no doubt) take care of those who cannot keep pace. The influence of certain popular magazines and of vocal but ill-informed critics will continue to create problems for educators. Bond issues will continue to be defeated or passed on emotionalized issues rather than on a rational analysis of the needs of children and of society.

Facilities from Earlier Times

William W. Caudill, an outstanding American architect, has designated 1950 as a turning point in school architecture.[1] Since 1950, there has been increasingly close cooperation between architects and educators and growing public acceptance of "contemporary" design. In discussing American building as a whole during an earlier period, roughly 1910 to 1933, Caudill says:

> This was a period of rationalization in building technology, of gestation, of great quantitative advance in building. America built prodigiously, and it built along well-established lines. The result was a remarkable improvement in the technological level of the entire building field and an equally remarkable stretching of hopelessly archaic formulas.[2]

Examples of pre-World War I school architecture can be found in the great majority of the country's school districts. The classrooms of these old structures are fairly large. They have high ceilings, poor lighting, operational windows for ventilation, unattractive windows and shades, space-wasting radiators, and desks, fixed or movable, which are immobile with regard to their orientation to fixed blackboards. Many have large adjacent cloakrooms but no running water.

Exhibit space, play rooms, and libraries are seldom found in these old buildings. They usually do have wide corridors and large basement rooms—rooms originally used to store old desks and worthless furniture, hoarded under the watchful eyes of economy-minded school officials. After World War I, architects tended to be more conservative in the use of materials and space. Attics were eliminated, classrooms became smaller, cloakroom space was found in the corridors or within the classrooms.

About this time, Dewey was beginning to be heard but not understood by elementary school people, as was Morrison in the secondary schools. But general school design failed to show any marked relationship to any defensible and clear-cut theory of education. Certainly, the needs of exceptional children, respect for individual uniqueness, and the demands of an expanding curriculum were not made manifest in the school architecture of the period. The depression of the 1930's and World War II served but to accent conservatism and schools constructed for a period of two decades failed to anticipate needs other than for austerity and economy. Class loads remained large and studies throughout the country were made to show why and how they should remain so.

Until We Can Do As We Would

When a principal is assigned to a school, he has no choice but to take the facilities given him and do all he can to adapt, alter, and supplement them for the welfare of the classroom teachers and pupils. The boys and girls of the school are living in the second half of the twentieth century and, if lucky enough not to be destroyed by the miseducated, they will live into the first quarter of the twenty-first century. This fact and all its implications must never for a moment be forgotten.

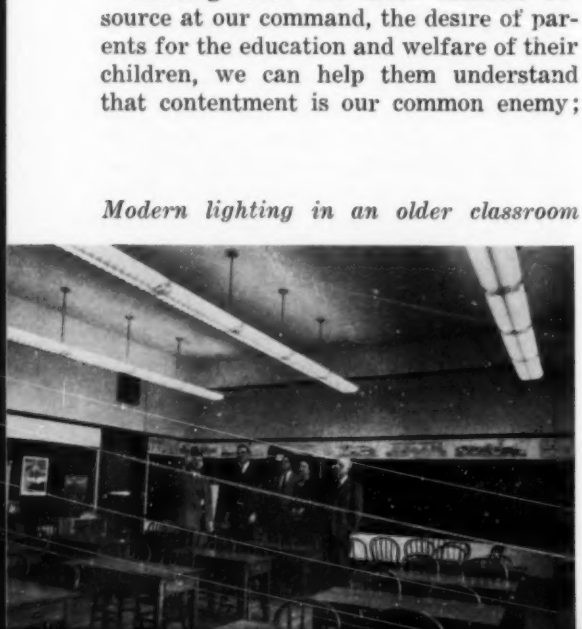
The principal must combine his talents with those of teachers, other school officials, parents, architects, educational theorists, psychologists, sociologists, anthropologists, and many others to give all children the best possible educational experiences. He must surmount the limitations imposed by the school building and he must not pause to condemn those of his community who will oppose him and speak, write, and vote against bond issues and the other means proposed for school improvement. He must remember that these same people are the products of our schools and that they tend to be limited by the semantic patterns and solutions given by our professional predecessors.

Starting with the most valuable resource at our command, the desire of parents for the education and welfare of their children, we can help them understand that contentment is our common enemy; that the tragic communes in which a billion people are losing their freedoms are more threatening than the *sputniks;* that to "go back" to more regimentation, to the applications of an atomistic and meaningless ontology in our methods, and to a disregard for the needs of the individual can create a world in which our children cannot survive.

With this approach, and it is difficult to see how changes can be brought about in any other way, we can enlist the aid of our community for appropriate legislation and for local support in the interest of better schools. If we help parents become identified with the problems of education at the local level, they will not attack well-formulated professional plans for improving the facilities at hand. They will support these plans and by participation in the planning process will often contribute to better plans.

In each school in which facilities are inadequate, the principal and others are faced with the question as to whether existing facilities can be adapted to current needs, or whether extensive alterations and structural changes will be required. In the remainder of this chapter, we will discuss first the adaptation of existing facilities and then the general conditions under which structural alterations and additions to a school should be considered.

Modern lighting in an older classroom



Adapting Existing Facilities

The schools of America show and will long continue to show the influences of nineteenth century theories and practices. Traditional practices are difficult to unlearn, especially when their perpetuation is encouraged by architecture. (Too, they are so comforting and reassuring.) Even schools now on drafting boards continue to reflect antiquated conceptions of the educative process.

Good teachers everywhere, however,

are making adaptations to overcome the limitations imposed upon them by structural design. Equipped with the understandings and skills for a child-centered approach to learning, and encouraged and aided by enlightened educational leadership, they are obtaining and using the facilities and equipment needed for today's educational program.

Classroom Alterations

There are any number of ways in which classrooms can be adapted to current needs without making major structural changes. School furniture, for instance, including movable chalk and exhibit boards, is designed to serve the demands for flexibility in modern education. Principals can greatly facilitate the use of movable furniture by arranging demonstrations to show how flexible furniture can serve the requirements of children working together or apart, and how it can be used for the effective separation of small group units when varying activities are being pursued. Movable cabinets can be a highly effective physical means of achieving this end.

In addition to the furniture required for large group, small group, and individual instruction, there are also variations in equipment and arrangements to meet the needs of varied types of curricula such as broad fields, child-centered, and separate subject. Also, movable furniture and chalkboards permit inexpensive shifts in grade and room assignments commensurate with shifting pupil populations from grade to grade. For example, many first-grade rooms now in use were originally built for older children. Later, they may need to be used by upper-grade pupils again. With fixed furniture, extensive alterations of chalk and exhibit board and cabinetry must be made—a rather complicated and expensive undertaking.

Modern furniture in an older classroom

Good examples of how all-purpose classrooms can be arranged are contained in a pamphlet, *Curriculum and the Elementary School Plant,* by Heffernan and Bursch.[3] While the publication is designed as an aid in planning new schools, the ideas and suggestions apply equally well in a program of remodeling and adapting existing facilities.

Library and Materials Center

A rapidly increasing number of principals today accept the idea that a library and materials center can provide indispensable services for teachers and pupils. The demand for qualified school librarians far exceeds the supply. Teachers in service are being trained as teacher-librarians and, in many places, clerical services are provided to enable them to devote full time to the educational functions of their position.

School rooms designed for library purposes, however, are to be found in only a relatively small number of elementary school buildings constructed prior to 1945. More recently, bond issues have been opposed and defeated because the plans called for school libraries and multipurpose rooms. Pressures are being felt in some schools for converting existing libraries into classrooms—this in the year 1959.

If library services adequate to support an excellent instructional program are to be provided, three things must be done.

1) We as principals and teachers must realize the essential role of library services. 2) We must show parents how the library functions in carrying out its essential role. 3) We must be resourceful and imaginative in adapting existing facilities for library purposes.

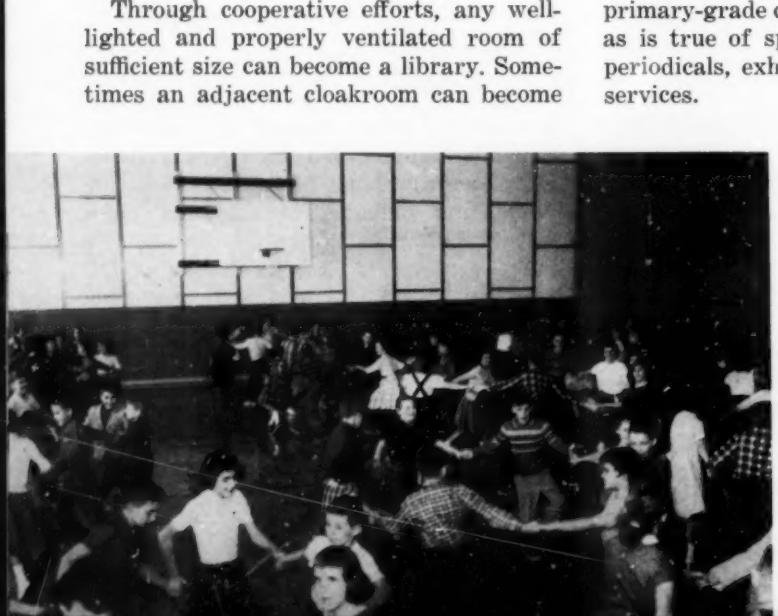
Good educational practices require the use of many books, periodicals, maps, pictures, slides, films, and sound recordings. If these are to be used effectively, they must be shared by all teachers and pupils and all must be informed of the nature and purpose of the materials available. Finally, and most important, children need to learn effective techniques in using reference materials and in using the library to pursue their individual interests and hobbies. The act of making choices from among many and varied books on the library shelves encourages the reading habit and develops taste for good literature.

Parents, including board members, who "went through" elementary schools unequipped with library services tend to be apathetic toward proposals for establishing libraries. Enthusiastic teachers and principals can overcome this obstacle. Once the will is established, the way to convert existing rooms into libraries will follow.

Through cooperative efforts, any well-lighted and properly ventilated room of sufficient size can become a library. Sometimes an adjacent cloakroom can become a workroom for the librarian and clerk and a storage space for materials. Movable furniture—shelving, tables of varied shapes and heights, and filing and cataloging equipment—can be purchased. Colorful chairs, pictures, walls, and draperies complete the equipment. A sink and running water should be provided if possible. Movable book shelves can become dividers for a comfortable primary corner, or a primary library can overflow into an attractively arranged spot in the corner of a corridor.

One school, lacking classroom space, designed and installed a complete and very attractive library in a large but little used corridor. Movable shelves became curtain walls, the backs of which were equipped for exhibit boards. Attractive lighting fixtures were installed and colorful chairs and round, rectangular, and trapezoidal tables were arranged functionally with regard to space and curriculum purposes to be served. Locked cupboards were used for records, films, projectors, and other expensive materials which needed to be protected.

If a library can be obtained by remodeling a school, it should be centrally located and should occupy an area at least equal to a classroom and a half for a 600-pupil school. Space and equipment designed for primary-grade children should be included, as is true of space for work, references, periodicals, exhibits, materials, and other services.



Indoor physical education

WHEN CONSTRUCTION IS OVER

Indoor Physical Education

No school can be effective as a laboratory for learning unless it meets the physical and social, as well as intellectual, needs of children. Good schools provide for each child daily experiences in physical activity under the direction of trained teachers. While the emphasis is on outdoor activities, weather conditions and the demands of specific phases of the physical education program require indoor facilities for perhaps one-third of the time in most areas of the country. Where multi-purpose or play rooms are not available, as is the case for most of the elementary schools built before 1945, improvisations are in order. Here, again, basement rooms and corridors have been or can be adapted for service of this kind.

Many forms of tumbling, climbing, rhythmic activities, and games can be conducted in limited quarters as can tests of strength and other phases of a modern program of physical education. *Given the needed equipment,* a well-trained teacher can, to a large degree, surmount the limitations of space. Two conditions, however, must be met—the space used must be well-ventilated and it must be kept scrupulously clean.

Occasionally, a small school may have a kindergarten room that is occupied only from nine to eleven-thirty in the morning. This room, properly cleaned and equipped for the purpose, can be used for physical education by first- and second-grade children for the rest of the day.

Rooms for Special Services

Again, with monotonous regularity, the story of progress in providing for the needs of exceptional children abounds with references to alterations and improvisations in the use of existing facilities. Only within the brief period of the past fifteen years can one find an increase in

provisions for exceptional children incorporated in original school design. Descriptions of physical facilities needed for exceptional children are well documented elsewhere.[4]

Obviously, a school district should not launch a program of remodeling old facilities for exceptional children without first securing information on such items as these.

- What is the approximate number of the various types of exceptional children in the district and in adjoining or nearby districts?
- What are the desirable guiding principles, philosophies, and procedures to be employed in selecting the proper location of special services and in planning adequate space arrangements and equipment of rooms for the special education of exceptional children?
- What are the opportunities for neighboring districts to pool their resources in providing space and competent teachers for a highly specialized and growing curriculum to meet the needs of exceptional children in a larger geographic area?

Although class enrollments of children in special programs are small, ranging from eight to twenty, their varied activi-

ties necessitate room space the size of an ordinary classroom. From forty-five to sixty-five square feet per child is the usual minimum space requirement. Space for speech correction, for the visiting counselor, and for diagnostic testing require smaller, perhaps average office size, rooms. Psychologists and nurses also need small rooms properly equipped for their services. Since most of these services are performed by workers who move about from school to school, proper scheduling enables them to be carried on in only one or two rooms.

It is assumed, of course, that all these rooms will be properly lighted, heated, and ventilated and tastefully decorated. Chalkboard and exhibit space must also be adequate.

Many teachers are now performing valuable educational services through conferences with parents. In this manner and in a relaxed atmosphere, teachers report pupil progress and interpret the philosophies and goals of education as they apply to individual children. Most of these conferences are held after school hours at the teacher's desk in the classroom. Many schools, however, are providing more appropriate locations—a quiet office, an attractive corner in the teachers' lounge, or in a nearby corridor, equipped with comfortable lounge chairs and nearby facilities for serving coffee. Principals should never underestimate the importance of setting an atmosphere of friendly cordiality in planning for teachers to conduct parent conferences.

Space for Instrumental Music

One looks in vain for a trend toward providing rooms built for instrumental music in elementary schools. Only a venturesome school administrator would provide for such facilities today as he plans new buildings in districts hard pressed for classrooms. Nonetheless, a growing number of school systems are recognizing the values of instrumental

Instrumental music in the library

music and where wills are strong, ways are being found.

Three types of rooms are needed for instrumental music:

1. Five or six small, well-ventilated, and acoustically treated areas, perhaps forty-eight to sixty-four square feet, for individual practice work.
2. One or two acoustically treated rooms of about 14′ x 10′ or more in area, large enough for three pianos and for small group instruction in piano, strings, and wind instruments.
3. The occasional use of a larger room for ensemble performances—a multi-purpose room, gym, auditorium, large stage, the room used for vocal music, or a regular classroom. Cupboards and small storerooms can be used to store instruments.

One fairly isolated classroom, preferably a corner room with windows on two sides, or a basement room could be remodeled to serve the first two types of needs. Lightweight materials of high density, such as double-thickness plaster boards, could be used as curtain walls in partitioning the area into practice and instructional rooms of the required sizes. A connecting corridor through the center can provide passageway and further reduction of sound transmittal.

Many schools contain large stages in their multi-purpose rooms or auditoriums. These can and are being equipped with soundproof folding doors and thus made available for instrumental music while the room is being used for other school activities.

One elementary school had a little-used corridor, one of two leading to a multi-purpose room. A door was added to this corridor so that it and the adjoining stage can be used for instrumental instruction. In another school, the physical education teachers gave a large office and storage room to the instrumental department for a considerable portion of the day. Cupboards were placed in nearby corridors for storing instruments and physical education equipment.

Three pianos were placed in the library of another elementary school and the instrumental department was given exclusive use of the rooms for two afternoons each week and at stated times before and after school hours.

Ensemble work in the elementary schools is nearly always scheduled during free time or before or after regular school hours.

Space for Large Groups

The growth of the community school concept, increasing awareness of the values of large group activities, and the beginnings of widespread experimentation with large group instruction combine to indicate the importance of having at least one large multi-purpose room in each elementary school. To attain maximum usefulness, a multi-purpose room should provide for as many as possible of the following facilities:

- convenient seating arrangements and storage
- access to a kitchen
- nearby toilet facilities for both sexes
- direct access to the out-of-doors
- bulletin board space
- platform space or stage
- facilities for the use of audio-visual equipment
- appropriate storage facilities
- zoned heating so that the multi-purpose room can be heated separately from the rest of the building

Where multi-purpose rooms are not available, it is wise to study existing buildings carefully before adding expensive gyms and multi-purpose rooms. Such facilities, of course, could be constructed

as the first section of a carefully planned remodeling program or of a new building to be constructed on the site prior to the demolition of an old structure. Meanwhile, larger group facilities may be created by removing a wall between two classrooms.

Lunchrooms

The number of persons using school facilities at lunch time is growing as are the evils of rushing large numbers of children through the cafeteria on split-shift arrangements. If good educational values and the physical well-being of children are to be promoted through the use of cafeteria and lunchroom facilities, two conditions must prevail: 1) Children must have an opportunity to eat their plate or sack lunches in an unhurried, relaxed, and pleasant social environment; 2) Teachers should have separate facilities where they may relax during the lunch period. These requirements present problems that principals must solve.

The use of portable food carts for serving hot lunches to primary children, perhaps in a kindergarten room in their wing of the building, is one way of relieving pressure on crowded cafeterias and lunchrooms. Permitting sack lunchers to eat in another area of the building is another way. Both pose problems of supervision that can be solved only by providing additional help through paid or volunteer services, preferably the former. In a growing number of schools, extra teachers of physical education are available and scheduled during the noon hour to direct children's lunchroom and recreational activities.

Making the Old More Beautiful

Children do not separate themselves from their environment. The influence of environment may be direct and physical or, as with older children, it may be more psychological. But always it is present, being soaked in, for values good or bad.

An almost universal characteristic of old school buildings is their institution-like drabness. School browns, black chalkboards, unbroken corridor walls punctuated with dark green lockers, unattractive wood floors, large radiators, double hung casement windows, shades in poor repair—any observer can extend the description endlessly.

The use of modern paint in pastel colors, draperies to replace the traditional shades, attractive light fixtures, gray or blue chalkboards, attractive panels for exhibit purposes, colorful furniture, and new soft spray glazes on corridor walls can perform wonders in improving the interiors of existing buildings.

More important than paint and panels, however, is the feeling for beauty that children can develop by becoming concerned with plans for improving their surroundings. Participation sharpens individual responsibility and awareness. Nurtured on all educational levels, a feeling of beauty starts with the simple matter of caring about it. If beauty is considered valuable and worth troubling over,

a child will absorb the feeling and become appreciative of the many contributing details—flowers, growing things, vases, posters, murals, a sunlit library corner adorned with colorful posters and attractive books.

Adorning a classroom is not enough; other forms of action also are needed. Let children talk about what they like and don't like. Let them make changes accordingly. Let them build, create, and display things they consider decorative and beautiful.

Recent experiences in constructing new schools have shown that beauty in design and detail can be attained at little or no additional cost. When plans are drafted for remodeling existing facilities, exacting standards of beauty should constantly be maintained.

When Should Major Changes Be Made?

Most of the suggestions made in the foregoing sections of this chapter can be implemented through changes in equipment and in the use of facilities, and through comparatively minor adaptation of existing structures. The contrast, however, between the requirements of an excellent elementary school program and the facilities in many buildings is so tremendous that the comparative values of new construction and renovation of existing buildings must be carefully considered.

In weighing these values, it is best to base the study on a comprehensive survey of the buildings and building needs of the school district as a whole. Such a survey can assess the long-term building situation and help to guard against costly errors, such as spending a great deal of money on renovating and adding to a building which, because of its location with reference to the student population, will not continue to be used for more than a few years.

In the opinion of Basil Castaldi of the University of Illinois, five basic questions must be answered in the affirmative if a building is to be renovated or extensively altered.

1. Is the present location the best one with reference to the residences of the children to be served?
2. Is the site adequate, or can it be made adequate at a reasonable expenditure?
3. Is the building structurally sound, or can it be made so at reasonable cost?
4. Is the building safe and healthful, or can it be made so at reasonable cost?
5. Does the building provide for all the important elements of the desired educational program and services, or can this be accomplished at a reasonable cost?

Location

Older elementary school buildings are often poorly located with reference to the children to be served. As the process so common in urban America of neighborhood transition from homes to commercial establishments and industry continues, elementary schools which were formerly in the center of neighborhoods with many children now find themselves faced with dwindling enrollments.

Under some conditions, it may be more feasible to transport children to adequate facilities than to invest large sums of money in renovating older structures which are becoming less and less useful because of their location.

Site

Many authorities recommend sites for elementary schools of ten to fifteen acres in suburban and rural sections. Specific

site needs depend upon several factors. A useful summary of eight such factors—utilization, size, relation of home and school, topography, zoning and community planning, highways and traffic, expansion of community, cost of site—is found in Engelhardt, Engelhardt and Leggett, *Planning Elementary School Buildings.*[5]

Possibilities for adding to the site of most older buildings are meager because land is often not available or its cost is prohibitive.

Structural Soundness

The crucial nature of this factor is so clear that it needs little discussion. Appearance of soundness and reality may be so different, however, that principals and other educators are well advised to consult highly competent professionals. We should not be content with mere assumptions about the present and future structural condition of buildings.

Temperature and ventilation, lighting, hearing conditions, and sanitary conditions are especially important in providing a healthful school environment. Older buildings are likely to be lacking in each of these regards. For example, the lighting in many older buildings often provides relative low-level seeing conditions. Since fluorescent lamps use less power to produce the same amount of light than do incandescent lamps, it may be possible under certain conditions to achieve better lighting with existing wiring by installing fluorescent fixtures. Again, plans should be checked with experts.

Safety factors are so numerous that principals may well use several check-lists in analyzing their buildings. One of the best of these is a set of 100 questions entitled "How Safe Is Your School?" [6]

Technical assistance should be obtained in checking electric and heating installations. One thing can be done immediately to correct fire hazard conditions. Basements, attics, and storerooms can be cleared of all outmoded furniture, books, papers, theatrical props, and other useless materials. Many educators are prone to neglect this important duty. Fire prevention officials can give descriptions of necessary structural alterations but principals and custodians can look to storerooms and remove all useless and cluttered materials and furniture which may be creating a fire hazard.

Suitability for School Program

If money can be made available for extensive alterations of and additions to a school building, school officials and architects should start with the assumption that the teacher, his goals, and his relationships with children are matters of first importance. To provide new facilities which will be a positive force to improve these relationships and implement goals, teachers must in some manner be involved in planning. For example, an architect or school planner cannot make adequate plans for groupings, large and small, of children unless he knows something of the learning values to be served by such multi-groupings. Alterations and additions for many different kinds of learning experiences can be planned only after the nature of such experiences is described in detail with reference to the necessary facilities.

Cost Considerations

In the case of many older buildings, the high cost of attaining fully satisfactory conditions related to site, structural soundness, health, and safety will make new construction more economical than renovation. A careful study of these and other factors may be extremely useful in demonstrating the need for new buildings. Community representatives can be involved in the process of study and data gathering so

that they gain real insight into the issues involved in a decision about whether to alter an older building or instead construct a new one.

The average useful life of school buildings is 50-75 years. It is regarded as uneconomical to spend as much as half of the cost of new construction on altering or adding to a building which has only half its useful life remaining. If, on the other hand, the cost of the alterations is less than one-third the cost of new construction, renovation may be economically feasible.

Serious mistakes in renovation projects are often made when all the relevant assumptions are not clearly identified and carefully studied. For example, it is frequently assumed that existing heating plants will serve additions to buildings. If the addition is completed and heating capacity is insufficient, it is sometimes necessary to tear down and replace exterior walls in order to add a boiler. Unforeseen expenses in such a case may more than balance the savings anticipated from adding rather than replacing an existing structure.

Another assumption which is often made is that facilities in an existing building can be shared by more pupils and activities when the building is made larger by additions. Before such an assumption is made, it is necessary to determine the extent of use of facilities and the potential which remains for additional use, both at present and for the future when enrollments might be much larger. In some cases, problems of scheduling, maintenance, and equipping will prevent any substantial increase in the use that can be made of additional facilities.

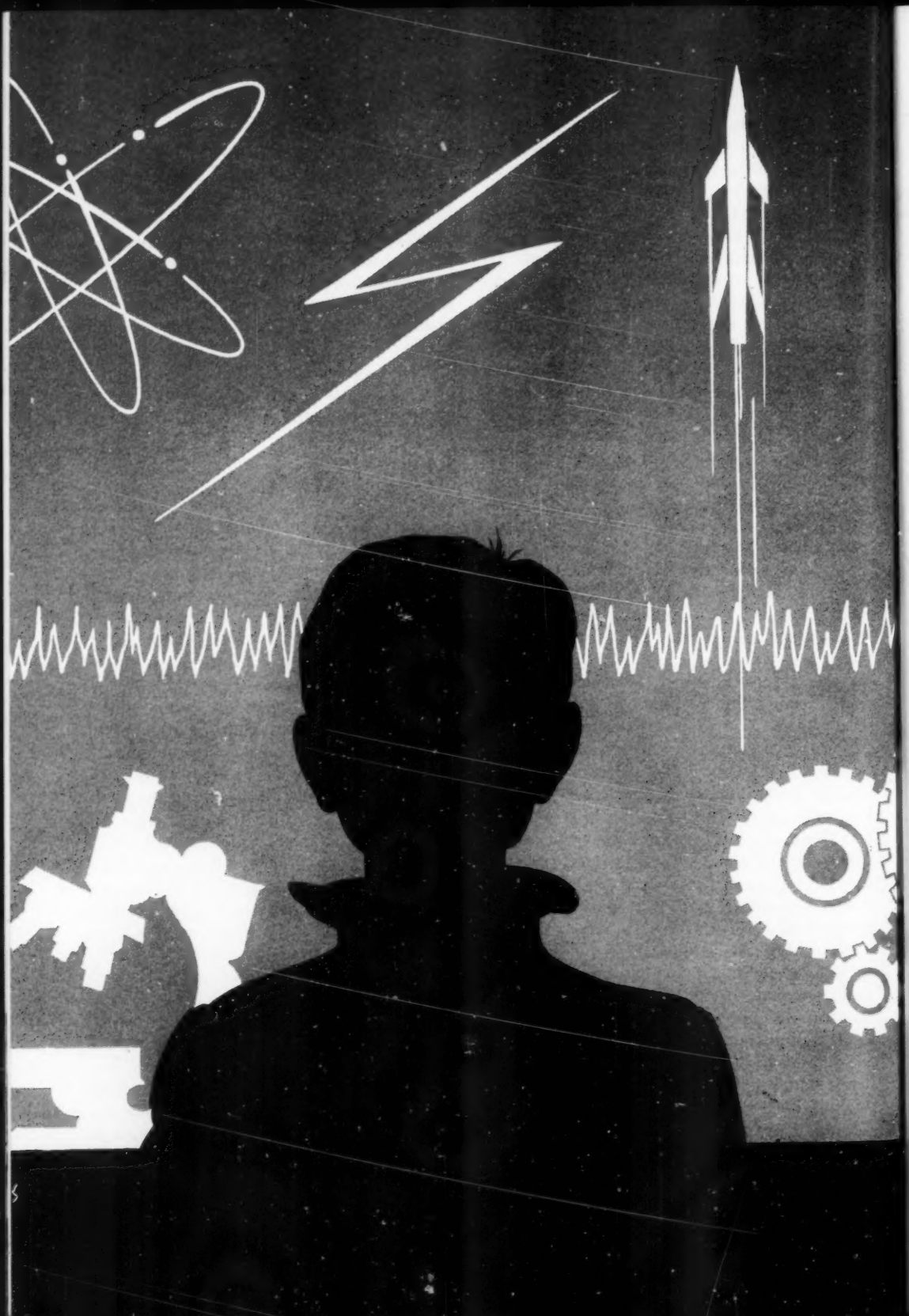
Some of the expenses of matching floor levels and materials for appearance can be avoided by constructing free-standing additions. These have a further advantage in that the original building may be abandoned when it has reached the end of its usefulness without abandoning the addition, which probably would have several more years of useful life.

Renovation and construction of additions may yield less value for the money expended than new construction. Compromise is always necessary when so many aspects of the total situation are fixed by the location, the size and arrangement of existing structures, and other factors which cannot be varied. The decision about whether to rennovate or to construct a new school is a major one, demanding study and thoughtful determination.

Conclusion

Well-endowed or profit-motivated individuals and organizations cite figures to show that America faces no serious shortage of classrooms. Their statistics, however, do not take into account obsolete buildings, expanding programs, and increasing community needs. These critics often force educators to increase enrollments in existing classrooms and to "go back" to a traditional curriculum and a rigid and authoritarian methodology. School principals, however, cannot permit these pressures and the limitations imposed by outmoded school buildings to divert them from their inescapable responsibilities as educational leaders. With the aid of competent teachers and well-informed parents, a degree of educational flexibility can be attained with existing facilities through alterations, adaptations, and the wiser use of equipment.

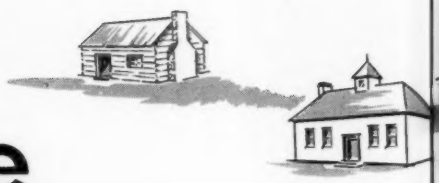
Parents usually become dissatisfied with inadequate school facilities and change their thought and action patterns when they are involved in efforts to improve the educational experiences of their children. By cooperating with parents, principals and teachers are courageously making the necessary changes in building structure, equipment, and utilization as their schools move toward better educational services.



WHEN TOMORROW COMES

When tomorrow comes . . . what will our schools be like? . . . what kind of program will be taught? These are difficult questions. But the schools we build today must take such things into account. Each new school must grow out of some vision of the future, as well as the best the present can tell us. Only then may we hope that the bricks and concrete we lay today will continue to serve our children well when tomorrow comes.

The Schools of the Future



Anne Hoppock

BUILD a school to house the kind of program you want. The writers of this yearbook have stressed this principle repeatedly. What kind of schools do we need for the last decades of this remarkable twentieth century? What kind of program should we plan for these children who, by turning a switch, will tune in on faces and voices in the far corners of the world; who will hurtle to these distant places at breath-taking speeds; whose exploring may be not of the Arctic but of the solar system?

The remarkable changes we have experienced and the even more startling ones which certainly lie ahead seem to imply great, dramatic changes in our educational program. So when the speakers say ringingly from the rostrums, "We must reshape our schools for the space age," it is natural for people to agree and to suggest space age type instruments for guiding our children through the strange, uncharted country.

But sober second thought keeps us (or should keep us) from rushing to the nearest launching platform and taking off into space. We who develop educational programs for young children have always had to project plans for an unknown future. If we avail ourselves of what is known about human growth and learning and keep in mind the main reasons for operating schools in America, we have quite dependable bases for planning wisely. We are not without a compass. There are some things we know.

Children's Needs Do Not Change

We know the needs of childen do not change. The remarkable advances of science have not changed the basic facts and processes of human development. We may reach the moon in our time but, as has always been the human lot, each child will experience birth and growth and death. He will work and play. He will live with other people in families and communities. He will know happiness and grief. He will have in him the desire to shape something in life uniquely his. He will reach out with yearning toward sources of strength greater than his own and toward meanings for life which transcend the material.

The rockets soar from the launching platforms, the Argonauts train for space flight, new satellites circle the sun, but the fundamental needs of a growing child remain the same. He will continue to need those conditions for sturdy growth and learning that he has always needed—good nutrition, vigorous activity in fresh air and sunshine, rest and recreation, love and acceptance from parents, teachers, and

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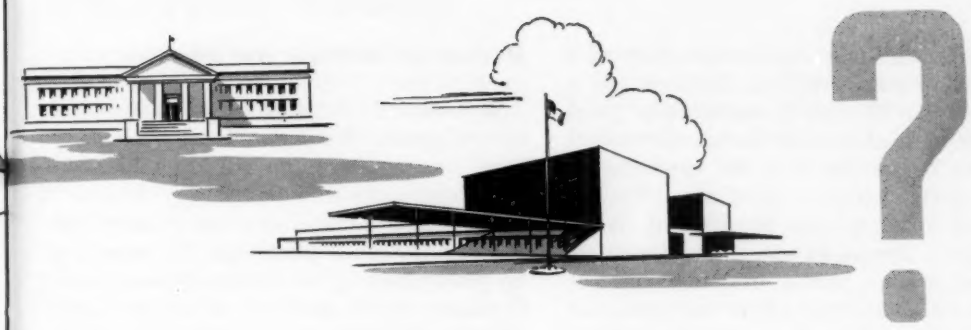

friends, support in facing pain and fear, wholehearted involvement in work worth doing, more success than failure, a developing set of values to apply in making ethical choices, a growing understanding of himself and what he wants to do with his life, the skills and zest which will make him a life-long learner, the understandings and ways of behaving which characterize a free, responsible, and caring citizen.

What better preparation for facing an unknown future can a child have than a sturdy body, self confidence, a zest for learning, the ability to give and receive love, the desire to live a constructive life?

The Future Depends on the Present

We know that a good future depends upon a good present. The only defensible way to ready children for their unknown future is to help them learn to live well *now* as children of five or nine or eleven. Our prime hope of preparing children adequately for an unpredictable adulthood is to help them develop skill, independence, courage, humaneness, and feeling of adequacy in dealing with life *now*. Education tomorrow, as today, must concern itself with the improvement and enrichment of children's *present living*.

In any age, then, the focus of the school must be upon the child and his present needs as he grows up in an ever-widening community with a teeming, changing life. The good school, in the words of a great teacher, is not exclusively child centered, not exclusively society centered, but child-growing-up-in-his-community centered.

An elementary school is sure to keep pace with the changing times, is "reshaping itself for the space age"—

- if it employs the fast-growing body of scientific knowledge about children and how they learn,
- if its curriculum draws appropriately upon the problems and resources of the community as vital materials of instruction, and
- if evaluation focuses upon the extent to which present living is enriched and improved.

Education so based will always be in step with the times, for it is the very stuff of which life is made.

Basic Values Endure

We know the enduring values of American education. We do not know for sure what man's life will be like in 2060, but we ought to be able to say what kind of man we hope tomorrow's schools (and the next century's schools) will produce.

Certainly, our American schools will continue to be charged with the making of free, thinking, self-governing men—not docile little brothers of the Big Brother.

Certainly, we shall need humane men who value every man's right to freedom and a decent life. We shall desperately need creative men, able to devise the new social patterns needed to turn the products of our inventive genius to good uses. We are not able to accept the prospect of living indefinitely armed to the teeth, diverting the best of our human and material resources to outstripping the war potential of the enemy. We cannot, even for selfish reasons, continue to condone the existence of large numbers of people in various parts of the world who are today living in misery and degradation.

It seems safe to predict that the major task of the elementary school of tomorrow will be that of educating intelligent, active, caring citizens of our democracy. In doing so, the most vital resource we have is the on-going life of the classroom and school. Here is children's most valuable opportunity for learning through thoughtful practice the meanings of democratic citizenship—meanings they must acquire to be contributing members of our society.

Education for tomorrow, if it holds to the enduring values of American education, will be arranged to provide quality education for *every child.* The program will not be enriched for a few; it will be life-enriching for every child. We will continue to reject the proposition that the best education should be reserved for the most able on the assumption that their contributions will be most valuable. The life of every child is precious; in our many-faceted modern life, the contribution of every one of our citizens is potentially valuable.

The more rapidly change takes place in the material aspects of living, the more important it becomes to hold fast to these enduring values in American education. The unknown future will indeed be perilous if in moving toward it we discard the values which to us in America are the very heartblood of our way of life.

Mechanical Solutions Not Effective

We know that mechanical solutions are not effective. We know from experience some unwise directions for the schools of tomorrow to move.

We know that efforts to remake the schools for the space age by speeding up production is wasteful and dangerous. Children aren't machines to be fed more rapidly and operated at higher speed in order to produce faster. The introduction of the "subjects" of the high school into the elementary school (so as to move the subjects of the college into the high school) is an ill-conceived practice. The early introduction of a second language (even if it were genuinely learned and used) will not go far toward understanding or affecting the aggressive nationalism, greed, prejudice, and lack of intellectual and moral discipline which stand in the way of decent human relationships and world order. The intensification of science and mathematics teaching beyond what is appropriate for young children bears little relationship to the dangers of "dirty" bombs, or the hazards we face when frightened world powers face one another with terrible weapons.

The piling on of homework unsuitable in quantity and kind, the hurrying of the more able through school by grade skipping and "academic" summer school programs, the return to lecturing and the textbook centered curriculum as means of pouring in more subject-matter are deplorable practices because they interfere with learning. Learning is hindered when children do not have time to absorb the meaning of experience, when ability to give back facts on recitations and tests is more valued than learning to think and act on the basis of facts, when depth and scope in the child's curriculum is sacrified in order to teach faster and earlier, when the wholeness of learning is ignored by departmentalization which breaks the cur-

riculum into isolated segments in an effort to teach more, when children are so overwhelmed by quantity to master that their natural eagerness to learn is driven underground.

Equally futile and inappropriate in American schools is the idea, tried and found wanting early in the century, that teaching efficiency is increased by sorting and segregating children. There is grave danger in the present move to use tests as infallible measures of the power to learn and as sure predictors of the nature and quality of adult achievement. It is sad to see children, even small children, tested and sorted and the grade of inferior stamped upon them for all to see by their placement into segregated groups. The natural social balance of the classroom is destroyed and the opportunity to use the classroom as a laboratory for learning the ways of democracy is lost. We have worked long and hard to face up to the facts of individual differences among children and to operate a classroom so that each child learns as he is able and makes a valued contribution. The false assumption that testing, sorting, and "ability" or "homegeneous" grouping can be used to reduce appreciably the range of differences and make teaching easier and more efficient is taking us backward to truly inefficient mass methods of teaching.

Perhaps the most inappropriate among the various proposals to use mechanical methods to develop "the school of the future" is the proposal to substitute a television set for a teacher. It is hard to understand how any thoughtful person can believe that a flickering shadow on a TV screen can take the place of a wise, skilled, loving guide living with young children in the classroom.

We *are* living in a scientific era. Surely, we must use the findings of science in the improvement of schools. The point is that we must use the findings of the sciences which apply in the education of children. Education is basically a human enterprise. It is concerned with helping young human beings to grow up well. The pertinent findings lie not in the realm of technology but in the sciences concerned with human behavior.

Applying What We Know

What shall we do about what we know? This article is concerned with the kind of educational program which should be carried on in the buildings which will be constructed for children in the decades ahead —the schools of tomorrow housing generations whose future we do not know. These schools of the future will be better than those of the present, but not because we devise bizarre organizations or methods designed for space men. They will be better if we employ more extensively and skillfully what we now know about children and the world in which they are growing up. As we do, it may be that the following conditions will be found more commonly in tomorrow's schools.

Meeting Individual Needs

The individual needs of children will be more effectively met. Teachers will be helped to use methods of child study which will enable them to become experts in human development and to know intimately the particular children for whom they are responsible. Probably, they will work with children more than one year so they can more fully utilize the knowledge they gain. Standardized tests will be only one of many methods used to assess the particular needs, interests, problems, and abilities of individual children so that the curriculum can be shaped for each one.

Teachers will become increasingly skilled in working with individuals and small groups, and mass methods of teaching will be rejected.

Class size will be considered crucial. A class will be small enough so the teacher may provide informed personal guidance and support to each child. There seems to be a growing concensus over the country that 25 children per teacher is maximum.

The curriculum will be broad in scope, the materials of instruction sufficiently varied, the means for learning many, so that each child will be able to experience success at his level of performance.

Methods of evaluating and reporting progress to parents will be in harmony with the facts of individual differences.

Teachers will understand the prime importance of helping each child perceive himself as adequate. Nothing will be done in the school to teach any child that he is second class, or to hurt his confidence in his ability to cope with life.

Practicing Human Relationships

We will more effectively use the classroom and school as democracy's laboratory. The quality of human interaction—teacher with children, children with children—will be of first importance. Teachers will see the classroom as a child society, a miniature community where children learn the fundamentals of democratic living. They will be able to use methods of assessing social relationships among the children and will know ways of guiding these relationships positively. The relationship problems which arise will be a part of the curriculum.

The daily life of the classroom and school will be used to foster independence, responsibility, and self control. The techniques of group planning and action will be learned as children work together, but teachers will be equally concerned that individuals develop creativeness and initiative and the courage to stand against the group when personal integrity demands it.

Life-Related Curriculum

The curriculum will be more life related. We will employ more widely and intelligently the understanding that "learning begins with what you know." There is probably nothing important for a child to learn which cannot be related meaningfully to his own experiences and the life about him.

School will be wherever the things to be studied are found. People, places, things, institutions in the community will be important instructional materials. Many are nearby. Others can be reached by bus or train. (Perhaps the school of the future will have its own helicopter for educational trips.) The school garden, camp, or farm may provide learning experiences in the out-of-doors which are otherwise unavailable.

Supplementing firsthand experiences will be vicarious experiences, so vivid as to be almost real. Films, records and tapes, radio and television (used as an instructional aid, not to replace the teacher) will be widely and intelligently used. Modern methods of taping and recording will make it possible for teachers to use the best of radio and television as instructional materials in the classrooms of elementary schools.

In a life-connected curriculum, books become more important than ever. To interpret and to extend into time and space the many firsthand experiences provided, large classroom and school libraries will be needed.

Heterogeneous, Self-Contained Classes

Classrooms will be heterogeneously organized and self contained. Differences in interests, backgrounds, and kinds of abilities will be welcomed as useful rather than deplored as difficult to teach. Segregation into "ability" groups will not prevent children of many kinds of abilities from ex-

periencing the satisfaction which comes from working together with mutual trust and appreciation.

The teacher and children will be together throughout the day. Departmentalization will not isolate the curriculum into unrelated parts. Teachers will be able to give guidance to a group of twenty-five children whom they are with all day rather than to meet briefly a hundred or more children in order to teach them a "subject."

The teacher will have major responsibility for planning with and for the children. Helpers will be available to use as needed—for example, consultants in the arts and physical education, health services personnel, and child guidance staff, as well as the principal and others who help in the development of the over-all program. Clerical help to save precious time for planning and adequate space for filing are examples of facilities which conserve teacher time and energy.

Space in the classroom will be provided so that various work centers can be set up with materials readily available. Toilets, wash basins, drinking fountains, and a door leading directly from the classroom to the outside are needed in the self-contained classroom.

Children Teaching Themselves

Teaching will be perceived as a process of arranging the conditions which make it possible for children to teach themselves. Teaching as the business of telling, assigning, and testing will be eliminated. Children will be constantly involved in planning, carrying out the plans, evaluating, and setting new goals. In the process, they will use a variety of educational materials wide enough in scope and difficulty so each can find what he needs and is able to use. It will become apparent that children drive themselves to learn what is significant to them. They do not need to be coaxed, baited, frightened, or bribed to learn.

A child can learn in school only a small part of what he will need in the years ahead. We will not be there when he faces problems in adulthood to hand him a book with the "right" answer in it. We arm him well if we nourish his inborn drive to learn, and help him acquire the skills of teaching himself.

Evaluation Used Creatively

Evaluation will be designed to assess how well the school is carrying out its major purposes and will be directed toward improvement of teaching and learning. This use of evaluation will require clear understanding of the purposes of the school. These purposes will be brought down from the realm of vague generalities and stated in terms of desired behaviors.

Teachers will know individual children well enough to set realistic expectations of achievement. They will be acquainted with the instruments now available for studying a child's status and will seek new ways of gathering evidence of learning.

The limitations of standardized tests will be understood so they will not be used in ways that harm children or limit the curriculum.

A Basic Criterion

The elementary schools of tomorrow are now in the making. In these days when the profession and the public are being subjected to unprecedented pressures to change the structure and even the purposes of the public schools, the directions for tomorrow are taking shape. Each seemingly small decision we make has its bearing on the total direction. The schools are moving in a sound direction whenever we successfully apply one simple criterion in decision making: Is this in the best interests of the children?

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P. 2: White Oaks Elementary School Annex, San Carlos, California; John Carl Warnecke, Architect.

P. 10: Francis M. Eisenman, photographer

P. 15, *top*: Pocantico Hills Schools, Tarrytown, New York; Bill Hedrich, Hedrich-Blessing, photographer

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P. 46, *bottom left*: photograph by Los Angeles City School District; *right*: Midway School, Decatur, Georgia, John Portman, Jr., Architect; furnished by Amos Trotter

P. 49: Mollie B. Dawson Elementary School, Austin, Texas, furnished by Bill Kitchens

P. 50, *top*: T. A. Brown Elementary School, Austin, Texas, furnished by Bill Kitchens; *middle*: Midway School, DeKalb County, Georgia, John C. Portman, Jr., Architect; *bottom*: T. G. Harris Elementary School, Austin, Texas, furnished by Bill Kitchens

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P. 125: Bruce Russell & Associates, Architects

P. 126, *right*: R. L. Falkner Studio

P. 129, *left*: Paige School, Schenectady, New York, Bill Hedrich, Hedrich-Blessing, photographer; Perkins & Will, Architects-Engineers; *right*: Bruce Russell & Associates, Architects

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P. 156: San Francisco Public Schools, Sponagel Photographs

P. 172: Courtesy of Sylvania Electric Products, Inc.

P. 176. Midway School, DeKalb County, Georgia, John C. Portman, Jr., Architect

Art by A. C. Ford & Associates, Richmond, Virginia.

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